

**NOT MEASUREMENT
SENSITIVE**

MIL-STD-40051-5

DEPARTMENT OF DEFENSE STANDARD PRACTICE

TECHNICAL MANUALS

MAINTENANCE INSTRUCTIONS



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1. SCOPE.

1.1 Scope. This standard establishes the technical content requirements for the preparation of maintenance instructions for weapon systems and equipment Technical Manuals (TMs) and Depot Maintenance Work Requirements (DMWRs). These requirements are applicable for both paper and digital page-oriented TMs. Electronic delivery of maintenance instructions for TMs is accomplished through the use of the Maintenance Instruction modular Document Type Definition (DTD). The DTD is available in digital format. Refer to MIL-STD-40051 for information on obtaining this DTD. All maintenance requirements necessary to develop Operator (-10), Unit (-20), Aviation Unit Maintenance (AVUM), Direct Support (DS) (-30), Aviation Intermediate Maintenance (AVIM), General Support (GS) (-40), and/or depot level (overhaul) TMs are included.

2. APPLICABLE DOCUMENTS.

The applicable documents in section 2 of MIL-STD-40051 apply to this Part.

3. DEFINITIONS.

The definitions in section 3 of MIL-STD-40051 apply to this Part.

4. GENERAL REQUIREMENTS.

4.1 General. Maintenance instructions shall be prepared for weapon systems, major equipment, components and applicable support and interface equipment. Maintenance procedures and supporting illustrations shall be prepared so that maintenance personnel can perform all required operator through depot level (overhaul) maintenance. This information shall be contained in work packages and become a part of a Maintenance Instructions Information Chapter.

4.2 Development of maintenance instructions. Maintenance instructions shall be prepared for all items comprising the weapon system/equipment, such as assemblies, subassemblies, components, wiring, junction boxes, and accessories. Tasks shall be presented in the order in which they are performed. Sound engineering principles and techniques, approved Logistics Support Analysis (LSA), service experience, performance data on similar equipment, and all other reliability, availability, maintainability (RAM) data available shall be used in the preparation of specific maintenance instructions.

4.3 Maintenance level applicability. Requirements contained in this standard are applicable to all maintenance levels unless specifically noted in bold and in parentheses (i.e., **-34 only**). The labeled requirements shall be applicable to all TMs containing that maintenance level. For example, a **(-20 only)** requirements would only be applicable to the following TMs: -12, -13, -14, -20, -23, and -24. Refer to the TM content selection matrixes in Appendix A of MIL-STD-40051.

4.4 Depot maintenance work requirements. When the contracting activity specifies that a Depot Maintenance Work Requirement (DMWR) shall be prepared to the best commercial practices, the depot requirements contained in this standard shall be used only as a guide, therefore, the conforming modular DTD for maintenance instructions cannot be used.

4.5 Standard tables. Various standard tables required are noted throughout the text of this standard in bold and in parentheses (i.e., **(standard table)**). The formats and table heading names of these standard tables shall have no deviations.

4.6 Preparation of digital data for electronic delivery. Technical manual data prepared and delivered digitally in accordance with this standard shall be Standard Generalized Markup Language (SGML) tagged using the modular Document Type Definition (DTD) for Maintenance Instructions and the Formatting Output Specification Instance (FOSI). The DTD and FOSI have been developed in accordance with MIL-PRF-28001 and ISO 8879. Refer to MIL-STD-40051 for information on obtaining or accessing this modular DTD and FOSI. SGML tags used in the modular DTD are noted throughout the text of this standard in bracketed, bold characters (i.e., **<maintwp>**) as a convenience for the TM author and to ensure that the tags are used correctly when developing a document instance.

4.6.1 Use of the DTDs / FOSIs. The modular DTDs referenced in this standard interpret the technical content and structure for the functional requirements contained in this standard and are mandatory for use. The modular FOSIs referenced herein interprets the style and format. As specified by the contracting activity, FOSIs or style sheets may be used to produce final reproducible paper copy for all TMs prepared in accordance with this standard.

4.7 Content structure and format. The examples provided at the rear of this Part are an accurate representation of the content structure and format requirements contained herein and shall be followed to permit the effective use of the modular DTD for Maintenance Instructions.

4.8 Style and format. Style and format requirements for the preparation of Department of Army TMs are contained in MIL-STD-40051-1; they are considered mandatory and are intended for compliance. Preferred general style and format requirements for Army TMs shall be provided by the procuring activity.

4.9 Work package development. Technical manual data developed in accordance with this standard shall be divided into individual, stand alone units of information work packages. A work package shall consist of descriptive, operational, maintenance, troubleshooting, support, or parts information for the weapon system or equipment.

4.10 Safety devices and interlocks. Information shall be prepared pertaining to the purpose and location of all safety devices and interlocks in conjunction with the pertinent procedures.

4.11 Electrostatic discharge (ESD) sensitive parts. If the equipment contains ESD sensitive parts, components, or circuits, cautions and ESD labels shall be incorporated into the applicable tasks and procedures to ensure ESD sensitive parts are not damaged or degraded during handling or operation. Refer to MIL-STD-40051-1 for requirements on labeling ESD. Actions which could damage ESD sensitive parts, but which are not directly related to handling or operation of ESD sensitive parts, shall not be annotated with the ESD acronym, but shall be preceded by a caution statement.

4.12 Nuclear hardness. If the weapon system/equipment has nuclear survivability requirements (for example, over pressure and burst, thermal radiation, electromagnetic pulse, or transient radiation effects on electronics), cautions and Hardness-Critical Processes (HCP) labels shall be incorporated into the applicable tasks and procedures to ensure the hardness of the equipment is not degraded during handling or operation. Refer to MIL-STD-40051-1 for requirements on labeling with HCP. Actions which could degrade hardness, but which are not directly involved in establishing nuclear hardness, shall not be annotated with the acronym, but shall be preceded by a caution statement.

4.13 Selective application and tailoring. MIL-STD-40051 contains some requirements that may not be applicable to the preparation of all technical manuals. Selective application and tailoring of requirements contained in MIL-STD-40051 are the responsibility of the contracting activity and shall be accomplished through the use of Appendix A, Technical Manual Content Selection Matrixes, of MIL-STD-40051. The

applicability of some requirements is also designated by one of the following statements: unless specified otherwise by the contracting activity; as/when specified by the contracting activity; or when specified by the procuring activity.

5. DETAILED REQUIREMENTS.

5.1 Preparation of maintenance instructions. Maintenance instructions shall be prepared as a Maintenance Information Chapter <mim>. This chapter shall be subdivided into individual work packages that provide maintenance information to enable a technician to receive, process, inspect, clean, service, test and repair the weapon system/equipment and associated components to an acceptable performance standard. Maintenance tasks shall be developed in accordance with the Logistics Support Analysis (LSA)/Maintenance Allocation Chart (MAC) or Maintenance Plan, and the Source, Maintenance, and Recoverability (SMR) codes developed for the weapon system/equipment and components. Maintenance work packages shall be arranged to coincide with the Functional Group Code (FGC) sequence followed in the MAC or Repair Parts and Special Tools List (RPSTL).

5.2 Types of maintenance chapters. Depending on the type and complexity of the weapon system/equipment, the TM may contain any of the following maintenance chapters.

- a. Weapon system/equipment.
- b. Component maintenance.
- c. Assembly maintenance.
- d. Subassembly maintenance.
- e. Auxiliary equipment maintenance.
- f. Software maintenance.
- g. Ammunition maintenance.
- h. AVUM/AVIM (-23) maintenance.
- i. Preventive maintenance services (**aircraft only**).
- j. Phased maintenance inspections.

5.3 Content requirements for maintenance information chapters <mim>. Maintenance information chapters shall consist of a title page and the maintenance work packages described in 5.4 through 5.4.5.10.

5.3.1 Maintenance instruction chapter title page <titlepg>. Every maintenance chapter in a TM shall have a title page. The title page shall include a chapter number. It shall be titled "Maintenance Instructions" preceded by the maintenance level and followed by the weapon system/equipment, subsystem, assembly, subassembly, or component name, as applicable. (i.e., Unit Maintenance Instructions for the 155MM, M10946 Howitzer, Aviation Intermediate Maintenance (AVIM) Instructions for the AC Power System, etc). (Refer to figure 1.)

5.4 Maintenance work packages. Maintenance work packages shall be developed for the weapon system/equipment and for all maintainable components/assemblies for each applicable maintenance level as indicated in the approved MAC or maintenance plan.

5.4.1 Work package content. Individual maintenance work packages shall be developed for the overall weapon system/equipment and each maintainable subsystem, assembly and component. These work packages shall include a scope of work, initial setup information, and all maintenance tasks, such as remove, inspect, service, test, install, replace, disassemble, assemble, repair, clean, adjust, align, etc. When initial setup information differs for specific maintenance tasks, additional work packages shall be developed. Work packages shall stand-alone and contain complete start-to-finish maintenance procedures. The words "END OF TASK" shall be placed below the last data item (i.e., text, illustration, etc.) of the maintenance procedures. The maintenance work packages described in 5.4.5.1 through 5.4.5.10 shall be prepared, as applicable.

5.4.2 Work package size. To facilitate useability or the revision process, work packages should not exceed 30 pages. A series of maintenance tasks can be divided into two or more work packages unless it is determined that separating the task information would degrade useability (i.e., removal and installation of the gun turret in one work package, disassembly and reassembly of the gun turret in a second work package).

5.4.3 Scope of task <wpsum>. All maintenance tasks that are included in an individual work package shall be summarized at the top of the work package. All maintenance tasks shall be identified immediately following the statement "THIS WORK PACKAGE COVERS:". (Refer to figure 2).

5.4.4 Initial setup information <wpinfo>. Initial setup information shall be included in each work package and shall immediately follow the scope of task. (Refer to figure 2). It provides the maintenance technician with general information, equipment, parts, material, and authorized personnel required to perform and complete all the maintenance tasks included in the work package. Setup information requirements are described below.

- a. Maintenance level <maintlvl>. The level of maintenance authorized to perform the maintenance contained in the work package (in accordance with the approved MAC) shall be stated. This shall be included for operator or crew, unit, AVUM, direct support, general support, AVIM, and depot levels of maintenance, as applicable. For example,

Maintenance Level

Unit

- b. Applicable configurations <appconfig>. When the work package does not apply to all configurations of the weapon system/equipment, the applicable configurations <name> covered by the work package shall be listed. Omit this requirement if the same tasks/procedures apply to all configurations. (If certain configurations require different tasks/procedures, separate work packages shall be prepared.) For example,

Applicable Configurations

Serial Numbers 12345 through 12399

- c. Test equipment <testeqp>. All test equipment required to perform the procedure shall be listed by name <name> and part <partno> or model number <modelno> designation if this information is not contained in an overall list elsewhere in the TM. If such a list exists, refer to

it by name <name>, item number, and work package number <simref> instead of repeating the information throughout the TM. For example,

Test Equipment

Multimeter (Item 4, WP 0108 00)

Oscilloscope (13057)

- d. Tools and special tools <tools>. The tool kit (box) assigned to the mechanic (on a 1-per-mechanic-by-MOS basis) to be used in maintenance of a particular equipment shall be listed by name <name>, tool kit number (<partno> or <nsn>), supply catalog (SC) <sc>, or TM number <tmno> if this information is not included in the Tool Identification List work package contained in the TM. If such a list exists, refer to it by name <name>, item number and work package number <simref> instead of repeating the information throughout the TM. No tool in the kit shall be further identified. Other tools required for performance of all tasks for the maintenance levels covered in the work package shall also be identified in the initial setup and shall be referenced to the Tool Identification List work package. "Other tools" includes tools which are part of/components of shop sets authorized to sections/teams; tools authorized by RPSTL and CTA-50-970; special and fabricated tools; and items of Test, Measurement and Diagnostic Equipment (TMDE). For example,

Tools and Special Tools

Fixed Open End Wrench Set (Item 47, WP 0110 00)

Screw Threading Set (SC number)

Vehicle Tool Kit (407425)

- e. Materials/parts <mtlpart>. All expendable items and support materials shall be listed <name>. The item number and supporting information work package <simref> which lists these items shall be given. Mandatory replacement parts shall be listed by name <name> (and part number <partno>, if any). The number, quantity <qty>, or size necessary to complete the task shall be listed, when applicable. When a mandatory replacement parts work package exists, it shall be referred to in lieu of the part number. For example,

Materials/Parts

Grease (Item 5, WP 0112 00)

Wiping Rags (Item 38, WP 0112 00)

Range Lock (P/N 8675309)

Range Lock Flange Kit (P/N 8675310)

- f. Personnel required <persnreq>. Personnel <name> and the number of personnel <qty> shall be identified if the task requires more than one. The Military Occupational Specialty (MOS) designation <nameid> is not necessary, but it may be included. For example,

Personnel Required

Artillery Mechanic 68M10 (1)

Artillery Mechanic 66J30 (1)

- g. References <ref>. Other work packages, TMs, and other sources (<extref>/<xref>) that are needed to complete the maintenance tasks shall be listed here. Only references not listed in equipment conditions shall be listed. For example,

References

TM 9-1015-252-20&P
WP 0100 00

- h. Equipment conditions <eqpcnds>. Any special equipment conditions required before the procedure can be started shall be listed here and cross-referenced to the appropriate source (<extref> or <xref>) for setting up the condition <condition>. For example,

Equipment Condition

Firing mechanism removed (WP 0010 00)

- i. Special environmental conditions <specenv>. Any special environmental conditions (such as ventilation, lighting, or temperature) <condition> that are required shall be listed here. The reason <reason> that such conditions are needed shall be explained. For example,

Special Environmental Condition

Darkened area required for testing lights.

- j. Drawings required <dwgreq>. All drawings (which are not included in the work package) required to complete the maintenance tasks shall be listed here. Drawings shall be listed by title <dwgname> and drawing number <dwgno>. For example,

Drawings Required

Power Supply Schematic (132E470092)

5.4.5 Types of maintenance work packages.

5.4.5.1 Service upon receipt work package <surwp>.

- a. This work package (refer to figure 3) shall contain information required for the user to ensure that the equipment will be adequately inspected, serviced, and operationally tested before it is subjected to use <geninfo>.
- b. Procedures shall be prepared for performing visual inspection of ammunition received from the ammunition supply facility. This inspection shall include verification that ammunition received was that requisitioned. Instructions shall be prepared for a condition check of the shipment (pallets, containers, boxes, and legibility of markings). Instructions shall be prepared to note the quantity of each lot for recording purposes.
- c. For equipment that requires extensive service upon receipt, this work package shall be further subdivided into the following tasks <surtask> described in 5.4.5.1.1 through 5.4.5.1.12.

5.4.5.1.1 Siting <siting>. Siting instructions peculiar to the equipment shall be prepared, as applicable. In preparing the instructions, operational and maintenance features shall be considered, such as the following:

- a. Location.
- b. Proximity to power sources.
- c. Effective ranges.
- d. Terrain requirements to avoid screening, reflections, ground clutter, and other poor operational conditions due to terrain.
- e. Technical requirements.
- f. Shelter locations.
- g. Compensating for adverse siting conditions.
- h. When the equipment contains large components such as towers and antennas that require orientation to a baseline during siting.
- i. Mobile equipment oriented during installation.

5.4.5.1.2 Shelter requirements <shltr>. For equipment normally housed in a permanent or semipermanent shelter (other than a military truck, van, or transportable shelter) during use, the following information shall be prepared.

- a. Amount of floor, wall, and height space required.
- b. A plan for a typical layout.
- c. Required weight capacity of the building floor.
- d. Dimensions required for installed equipment.
- e. Total weights that the floor must support and the area in square feet over which the total weight will be distributed.
- f. Environmental conditions (e.g., venting).
- g. Power requirements.
- h. Unusual requirements specific to equipment, such as air-conditioning.
- i. Architectural and engineering data on beam sizes, lengths, bending moments, and required supports shall not be included.

5.4.5.1.3 Service upon receipt of materiel <surmat>. The following instructions shall be prepared.

- a. Unpacking <unpack>. As a minimum, the following information shall be prepared.
 - (1) Any special sequence of action necessary to protect the equipment.
 - (2) If a special design reusable container is involved for either the end item or components which are authorized for replacement, instructions shall be prepared to report or reenter the empty container through supply channels. Instructions shall be prepared on how to package the unserviceable component in the empty container in the same manner that the new component was packaged if a component is being replaced.
 - (3) Man-hour requirements and total man-hours required for unpacking the equipment.
- b. Checking unpacked equipment <chkeqp>. Instructions shall be prepared for a condition check of the shipment (including that of pallets, containers, boxes, and legibility of markings). (Refer to figure 4, sheet 1 (**standard table**).) Instructions shall be prepared regarding any inspection procedures peculiar to the equipment. (Refer to figure 4, sheet 2 (**standard table**)). In addition, the following shall be inserted exactly as stated here.

"Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on SF 361, Transportation Discrepancy Report.

Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies in accordance with applicable service instructions (e.g., for Army instructions, see DA PAM 738-750).

Check to see whether the equipment has been modified."

- c. Processing unpacked equipment <processep>. Instructions shall be prepared for processing the unpacked equipment (e.g., removing excess lubricant from a new rifle), as long as they do not conflict with any warranty provisions. The following information shall be prepared, as applicable.
 - (1) Any special skills required by processing personnel.
 - (2) All caustic, corrosive, and/or toxic material used during processing shall be identified and applicable warnings and cautions given.
 - (3) Instructions on safe disposal of waste products generated during processing actions.
 - (4) Man-hour requirements and total man-hours required for processing the equipment.

5.4.5.1.4 Installation instructions <install>. Instructions shall be prepared to install the equipment properly, including use of tools; to make the necessary interconnections; and to lubricate, calibrate, and adjust the equipment.

- a. Cable diagrams shall be referenced or prepared as necessary. When cable assemblies are not supplied but are required for bench test setup, instructions shall be prepared for fabricating interconnecting cable assemblies from spares and bulk supplies. The part number, drawing number,

and manufacturer or designer for each part of the cable assembly shall be shown, and wires, connectors, pin connections, and letters or other designators shall be identified.

- (1) Instructions and cautions shall be prepared for any mating connectors that call for a special procedure either to make the proper connection or to prevent damage to the connector.
 - (2) A wiring diagram shall be prepared which fully identifies each wire to be connected, by color code or wire number if applicable. This diagram shall show the location of each pertinent terminal, which shall be identified by number or other marking, if available, or by position if neither is available. Where appropriate, voltage readings shall be annotated.
 - (3) All alternate connection patterns required for various modes of operation shall be shown and explained.
 - (4) Only one diagram shall be used to illustrate interconnection patterns which appear more than once within the same equipment.
- b. For installation of plug-in items, diagrams shall be prepared or referenced showing the location of items that are not installed in the equipment when received. Instructions shall be prepared whenever special techniques or connections are required.

5.4.5.1.4.1 Assembly of equipment.

- a. Instructions shall be prepared for assembling equipment that has been shipped unassembled. When the equipment is to be shelf or rack mounted, instructions shall also be prepared for assembly of the rack, if necessary, and installation of the equipment in the rack.
- b. When the equipment is shipped or delivered in specially designed containers, unpacking instructions shall be prepared. If the containers are to be used again, kept for future use, turned in to supply, or require a special disposition method, the necessary procedures shall be prepared. Assembly and installation procedures shall be prepared when needed. These instructions shall be supported by illustrations. As applicable, power requirements, connections, and initial control settings needed for installation purposes shall be prepared.
- c. For security measures for electronic data, instructions shall be prepared for handling, loading, purging, overwriting, or unloading classified electronic data under usual conditions. Instructions shall meet current security regulations as they pertain to automation security.

5.4.5.1.4.2 Installation.

- a. Installation instructions shall be prepared for all actions (including placing, mounting, and attaching) for the following.
 - (1) Cable and wiring interconnections.
 - (2) Proper use of special tools.
- b. Installation instructions shall identify all dimensions that must be maintained in placing, mounting, or attaching items.

- c. When initial adjustments can be made efficiently during installation, such adjustments shall be included.
- d. For equipment designed and intended for use in more than one type of installation (e.g., field, fixed station, and mobile), instructions shall be prepared for each type of installation involved.
- e. If performance of any step in the installation instructions requires the assistance of personnel from a higher level of maintenance, this shall be stated in a note similar to that below.

"NOTE

The following installation procedure must be made with the assistance of (insert level) maintenance personnel (include Military Occupational Specialty (MOS), if applicable)."

- f. Installation instructions shall be considered complete only when they include instructions for:
 - (1) All required installation options (e.g., Electrostatic Discharge (ESD) control requirements).
 - (2) Accessory items.
 - (3) Auxiliary items (those that extend or increase equipment capability).
 - (4) Grounding of the equipment for both safety and proper operation.
 - (5) Torque requirements.

5.4.5.1.4.3 Special applications. Installation instructions which are common to all special applications of a system shall be prepared. Details resulting from the installation but peculiar only to the equipment into which the system is being installed shall be omitted (e.g., special treatment required when installing the system in a vehicle or aircraft).

5.4.5.1.4.4 Van and shelter installations. The following information shall be prepared only to the extent required for the applicable level of maintenance.

- a. Instructions shall be prepared for the removal and replacement of each nonpermanent unit.
- b. Installation instructions shall not be prepared when the equipment is permanently installed in vans or shelters.
- c. Diagrams and instructions shall be prepared which pertain to electrical and interconnection wiring, exclusive of wiring peculiar to the equipment on which the installation is being made (e.g., headlight, ignition wiring).
- d. Instructions shall be prepared for cable run locations, equipment locations, circuit breaker panels, and other similar details.

5.4.5.1.5 Preliminary servicing of equipment <preserv>. Instructions for all lubrication required on newly installed equipment shall be prepared.

5.4.5.1.6 Preliminary checks and adjustment of equipment <prechkadj>. Instructions for all checks and adjustments to be made on newly installed equipment shall be prepared. Information on the location of items

such as controls and check points shall be prepared or referenced. Instructions shall be prepared for checks and adjustments that must be made before equipment is put into operation and for all other checks required to ensure proper operation of the equipment. These instructions shall include the following, as applicable:

- a. Checks for interconnections.
- b. Checks for grounding, including earth ground connections, earth conditioning for conduction, as well as a check of the grounding circuit for negligible resistance.
- c. Checks for adequate clearance for rotating or moving devices.
- d. Checks of initial settings of all controls that must be preset before power is to be applied.
- e. All other checks needed to determine that power can be applied without injuring personnel or damaging the equipment.
- f. Firm seating and connection of all plug-in parts, mating connectors, jacks, and plugs.
- g. Cable and wire harness routing, dressing, and fastening.
- h. Cautions against damaging transistors, diodes, and other electrically sensitive items.
- i. Replacement of all covers, inspection and access doors, and plates.
- j. Operation of safety interlocks and switches.
- k. Operation of ventilating louvers and intake and exhaust ports.
- l. Operation and content of liquid cooling systems.
- m. Lubricants and Corrosion Prevention Control (CPC) procedures.
- n. Switch and control settings that are preset at installation (installer's adjustments).
- o. Presetting and adjustment of automatic controls.
- p. Terminal connections.
- q. Required terminal or capacitor strapping.
- r. Preliminary test measurements.
- s. Presetting operator's controls. (Reference the operating instructions, as applicable.)
- t. Normal operating checks. (Reference the operating instructions, as applicable.)
- u. After-installation orientation.
- v. Burn-in of parts.

- w. ESD control standards.
- x. After operations, shutdown, checks, and inspections.

5.4.5.1.7 Preliminary calibration of equipment <precal>. Instructions for all calibration to be made on newly installed equipment shall be prepared.

5.4.5.1.8 Circuit alignment <calign>. Instructions shall be prepared for circuit alignment procedures. Applicable instructions shall be prepared in the following order.

- a. External connections <extconn>. Connections to external lines required for each installation option shall be included. Connection instructions shall conform to the requirements for installing wiring and cabling interconnections.
- b. Switch settings, patch panel connections, and internal control settings <setconn>. Instructions shall be prepared for all switch settings, patch panel connections, and internal control settings required for each installation option and mode of operation.
- c. Alignment procedures <alignproc>. Instructions shall be prepared for all alignment procedures, including any variations required for different installation options and modes of operation.

5.4.5.1.9 Ammunition markings <markings>. Instructions shall be prepared for marking ammunition and ammunition containers.

5.4.5.1.10 Classification of defects <defect>. Procedures shall be prepared for performing visual inspection of ammunition/containers (pallets, boxes, etc.) and shall include classification and disposition of defective ammunition/containers.

5.4.5.1.11 Handling <handling>. Procedures shall be prepared for handling ammunition.

- a. Unpacking <unpacking>. As a minimum, the following information shall be prepared.
 - (1) Any special sequence of action necessary to protect the ammunition.
 - (2) If a special design reusable container is involved for either the end item or components which are authorized for replacement, instructions shall be prepared to report or reenter the empty container through supply channels.
 - (3) Man-hour requirements and total man-hours required for unpacking the ammunition.
- b. Packing <packing>. As a minimum, the following information shall be prepared.
 - (1) Any special sequence of action necessary to protect the ammunition.
 - (2) Instructions shall be prepared on how to package defective ammunition.
 - (3) Man-hour requirements and total man-hours required for packing the ammunition.

5.4.5.1.12 Procedures needed to activate ammunition, mine, etc <arm>. Procedures shall be prepared for activation of ammunition, mines, etc., preparatory to detonation.

5.4.5.2 Equipment / user fitting instructions work package <perseqpwp> (personal use equipment). As applicable, equipment/user fitting instructions for personal use equipment shall be prepared. (Refer to figure 5.)

5.4.5.3 Preventive maintenance checks and services (PMCS), including lubrication instructions, work package <pmcswp>. This work package shall consist of PMCS information and periodic lubrication <lubricant> instructions. (This work package is not required for aircraft TMs.) The content of PMCS shall be based upon the principles of Reliability Centered Maintenance (RCM) logic and shall include applicable scheduled corrosion inspections. The PMCS procedures shall be arranged in a logical sequence requiring minimum time and motion on the part of the person(s) performing them and shall be so arranged that there will be minimum interference between persons performing the checks simultaneously on the same end item. Instructions shall be prepared in the following order.

5.4.5.3.1 Introduction <pmcsintro>. The introduction paragraph shall explain the purpose and use of the PMCS table. (Refer to figure 6.)

- a. An explanation shall be prepared for each column of the table and any general checks/services that are common to the entire piece of equipment. The explanation for the item number column shall detail how the item numbers are used when recording results of PMCS on DA Form 2404, Equipment Inspection and Maintenance Worksheet.
- b. General statement(s) shall be prepared which apply to the overall understanding of lubrication requirements.
- c. Lubricants shall be identified by standard military symbols in accordance with MIL-HDBK-113 and MIL-HDBK-275. The following lubrication interval symbols shall be used, as applicable.

D—daily	B—biennially
W—weekly	H—hours (operated)
M—monthly	MI—miles (operated)
Q—quarterly	KM—kilometers (operated)
S—semiannually	RDS—rounds fired
A—annually	OC—on-condition
MRA—maintenance repair action	

- d. A statement concerning Corrosion Prevention and Control (CPC) shall be prepared. This statement shall contain maintenance instructions or reference CPC requirements contained in the applicable maintenance instructions. In addition, if the inclusion of such instructions are applicable, a statement shall be prepared which states that the instructions are mandatory.

(1) Oil filter statement. As applicable, the following statement shall be included verbatim:

"Oil filters shall be serviced/cleaned/changed, as applicable, when:

They are known to be contaminated or clogged,

Service is recommended by AOAP laboratory analysis, or

At prescribed hardtime intervals."

- (2) AOAP sampling interval statement. The following statement shall be inserted:

"Engine oil/transmission oil/hydraulic fluids must be sampled at (insert applicable hour/mileage timeframe) as prescribed by (insert TB 43-0106, Aeronautical Equipment Army Oil Analysis Program (AOAP), or DA PAM 738-750, Functional Users Guide for the Army Maintenance Management System (TAMMS))."

- (3) AOAP not available/non-enrolled statement. When a component/equipment is not enrolled in the AOAP or oil analysis support is not available, the following statement shall be inserted:

"This (enter name of component/equipment) is not enrolled in the Army Oil Analysis Program. HARDTIME INTERVALS APPLY."

- (4) Warranty hardtime statement. The following statement shall be used, as applicable:

"For equipment under manufacturer's warranty, hardtime oil service intervals shall be followed. Intervals shall be shortened if lubricants are known to be contaminated or if operation is under adverse conditions (such as longer-than-usual operating hours, extended idling periods, extreme dust)."

- e. When the equipment contains fluids, such as lubrication oil or hydraulic fluid, leakage criteria shall be prepared for the PMCS introduction as follows and referred to in the NOT READY/AVAILABLE IF: column.

"It is necessary for you to know how fluid leakage affects the status of the (enter component/equipment name). Following are types/classes of leakage you need to know to be able to determine the status of the (enter component/equipment name). Learn these leakage definitions and remember - when in doubt, notify your supervisor.

CAUTION

- Equipment operation is allowed with minor leakages (Class I or II). Consideration must be given to fluid capacity in the item/system being checked/inspected. When in doubt, notify your supervisor.
 - When operating with Class I or II leaks, continue to check fluid levels as required in the PMCS.
 - Class III leaks should be reported immediately to your supervisor.
- (1) Class I — Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.
 - (2) Class II — Leakage of fluid great enough to form drops but not enough to cause drops to drip from item being checked/inspected.
 - (3) Class III — Leakage of fluid great enough to form drops that fall from item being checked/inspected."

- f. When specified by the procuring activity, the first page following the introduction shall consist of an illustration of the equipment. This illustration shall include a routing diagram by which the PMCS will be performed.

5.4.5.3.2 PMCS procedures. The checks and services shall be in tabular form as shown in figures 7 and 8 (**standard tables**) and shall be prepared in accordance with the instructions in 5.4.5.3.2.1.

5.4.5.3.2.1 PMCS table preparation <pmcstable>

- a. Item number column <itemno>. Item numbers shall be assigned to procedures.
- b. Interval column <interval>. Information in this column shall show the designated interval when each check is to be performed. Procedures done first or most frequently (i.e., "before" checks and services) shall appear prior to "during" and "after" checks and services. (Refer to figures 7 and 8 for examples of completed interval column.) When more advantageous to the user, intervals shall be subgrouped by crewmember(s) as shown on figure 8.
- c. Man-hour column <manhours>. Man-hours required to complete all prescribed lubrication services shall be stated to the nearest 10th of an hour. (Refer to figures 7 and 8.)
- d. Item to be checked or serviced column <checked>. The items listed in this column shall be identified in as few words as possible to clearly identify the item. Usually the common name (e.g., bumper, gas can and mounting bracket, front axle, etc.) will be enough. (Refer to figures 7 and 8.)
- e. Procedure column <pmcsproc>. This column shall contain a brief description of the procedure by which each check is to be performed, as well as any information required to accomplish each check or service, including lubrication, appropriate tolerances, adjustment limits, and instrument gage readings. Illustrations shall be prepared to identify the location or the process of the task being performed and shall be integrated with the procedures. (Refer to figures 7 and 8.) Whenever replacement or repair is recommended, this column shall reference the applicable maintenance instructions.
 - (1) Lubrication procedures shall be prepared including information on authorized lubricants, lubrication intervals, man-hour requirements, and the AOAP. Lubrication instructions shall be prepared so as to enable the user to receive, lubricate, and return to an acceptable performance standard all components of the equipment in a minimum of time with the skills, tools, test equipment, and spare parts authorized by the LSA/MAC. Information shall be included for any special lubrication required under extreme temperature, altitude, and humidity conditions within the limits established by the design specification for the equipment.
 - (2) Lubricant types and abbreviations for flight vehicles and components shall be identified by standard military symbols as specified in MIL-HDBK-275; lubricant types and abbreviations for ground equipment systems, lubricants, functional fluids, preservatives, and specialty products shall be identified by standard military symbols in accordance with MIL-HDBK-113. (Required abbreviations not covered in the appropriate handbook will be provided by the procuring activity.)

- (3) Lubrication instructions shall be prepared to present all applications, procedures, lubricants, and lubrication points. When grouped lubrication points require the same lubricant at the same interval, the type and number of points shall be identified and described by one of the following methods.
 - (a) Multi-headed arrows. Multi-headed, solid-shafted arrows shall point to each of the lubrication points.
 - (b) Lubrication point notes. Lubrication point notes shall contain instructions for applying lubricants, taking into account the following factors: type, grade, availability, and properties of the prescribed lubricant; expected temperature; lubrication guns and tools available to authorized maintenance level; types of lubrication fittings; and possible ill effects of excessive or insufficient lubrication. Caution shall be stressed where over- or under-lubrication of a part will damage that part or closely associated parts.
- (4) Disassembly and hand-packing instructions shall be prepared for medium- and high-speed antifriction bearings that are sensitive to the amount of lubrication applied and do not have bleed holes or relief valves.
- (5) Cleaning, disassembling, and assembling instructions required before or after lubrication shall be prepared or referenced.
- (6) Instructions shall be prepared for washing and natural drying of finely machined and dirt-sensitive parts before relubricating. Use of compressed air jets or temperatures above 212° F shall not be prescribed.
- (7) Instructions shall not specify a coating of preservative material, either before or after packing parts that are lubricated with grease; nor shall they specify an application of oil, solvent, or additional grease to a "sealed-for-life" or prepackaged antifriction bearing.
- (8) Where applicable, the statement "For Arctic operation, refer to FM 9-207, Operation and Maintenance of Ordnance Materiel in Cold Weather (0 degrees to minus 65 degrees F)." shall be inserted as a note. When specific restrictions, preferred grades of lubricant, and other conditions exist, notes shall be made in the table. For example,

NOTE

When MIL-L-2104 lubricant is authorized, use 15W-40 (OE/HDO-15/40) when available and applicable temperature range exists.

or

NOTE

15W-40 oil is not authorized in this particular (enter component name).

- f. Equipment not ready/available if: column <eqpnotavail>. This column shall contain a brief statement of the condition (e.g., malfunction, shortage) that would cause the equipment to be less than fully ready to perform its assigned mission. (Refer to figures 7 and 8.)

5.4.5.3.2.2 Mandatory replacement parts <mrplpart>. This paragraph shall contain a table listing all items that must be replaced during PMCS whether they have failed or not. The table shall reflect the interval at which these items must be replaced whether hardtime maintenance or on condition maintenance is the determining factor. (Refer to figure 9.) This table shall be the last page(s) of the PMCS.

5.4.5.3.3 Preventive Maintenance Checklist (PMC) (operator only). When specified by the contracting activity, a PMC shall be prepared as a separate document. Information for a PMC shall come from the applicable operator's PMCS.

5.4.5.4 Preventive maintenance inspections work package (aircraft only) <pmiwp>. This work package shall contain the requirements outlined in 5.4.5.4.1 through 5.4.5.4.3.

5.4.5.4.1 General information and introduction (aircraft only). The following paragraph shall be inserted.

"GENERAL INFORMATION

This section contains complete requirements for special inspections, overhaul and retirement schedule, and standards of serviceability applicable to the aircraft. The inspections prescribed in this section shall be accomplished at specified periods by AVUM activities, with the assistance of AVIM activities when required. Complete Daily, Intermediate, Periodic, or Phased inspections are contained in the (insert applicable aircraft inspection checklist TM)."

5.4.5.4.2 Standards of serviceability (aircraft only). The following paragraph shall be inserted.

"Standards of serviceability to be utilized in the day-to-day inspection and maintenance of the aircraft can be found as fits, tolerances, wear limits, and specifications in the aircraft maintenance manuals. Standards of serviceability for transfer to aircraft are contained in TM 1-1500-328-23."

5.4.5.4.3 Special inspections (aircraft only).

a. Definition and general information. The following paragraph shall be inserted.

"This information supplements scheduled inspections as outlined in the applicable aircraft inspection checklists. Inspection of items which are required to be inspected at intervals not compatible with airframe operating time or airframe inspection intervals is also included. Refer to DA PAM 738-751 (Functional Users Manual for the Army Maintenance Management System-Aviation (TAMMS-A)) for applicable forms, records, and worksheets required for these inspection intervals. Typical examples of this type of inspection are as follows.

- (1) Inspections which are solely contingent upon specific conditions or incidents that occur (e.g., hard landings, overspeed, or sudden stoppage), wherein immediate inspection is required to ensure safe flight.
- (2) Inspection of components or airframe on a calendar basis: e.g., first aid kits, weight and balance check, aircraft inventory."

b. Requirements. Requirements shall include items which qualify under the criteria for special inspections, e.g., hard landings, sudden stoppage, overspeed. These requirements shall be grouped under area headings only and shall be inserted in a columnar list on the inspection check sheet format in such a manner as to permit local reproduction of the entire section. A line drawing of

aircraft or accessory showing sequence for inspection by area shall be included. The area identified shall include all surfaces, materials, components, and equipment pertaining to that specific location. The legend shall identify the title or heading of each numbered area of the diagram.

5.4.5.5 Aircraft lubrication instructions work package (aircraft only) <lubewp>. This work package shall contain the requirements outlined in 5.4.5.5.1 and 5.4.5.5.2.

5.4.5.5.1 Lubrication instructions (aircraft only). Lubrication schedules shall be prepared to present all applications and procedures, lubricants, and lubrication points to completely lubricate aircraft.

5.4.5.5.2 Lubrication charts (aircraft only).

- a. Lubrication charts shall consist of a main drawing prepared as a three-dimensional diagram, and such enlarged or detailed views as are considered necessary to identify items which otherwise would be obscured. They shall show all lubrication requirements for all parts of the aircraft requiring periodic lubrication, other than those lubricated by the main engine oil system. The charts shall also indicate type of lubricant, method of application, and frequency. This information shall be presented through the use of a standard symbol. (Refer to figure 10.)
- b. Use of black silhouette figures representing a likeness of the tool used in the application (oil can, grease gun, brush, or hand) shall be the accepted means of presenting application methods on the lubrication chart.
- c. Abbreviations, as specified in MIL-HDBK-275, shall be used to present lubricant types. In the event a lubricant does not have an abbreviation listed in MIL-HDBK-275, the abbreviation shall be provided by the procuring activity. Assigned application symbols, type abbreviations, and frequency shall be placed within the standard lubrication symbols.
- d. A key shall be prepared for the chart to define each application symbol and lubricant abbreviation used. Consecutively numbered notes may be used to specify requirements other than normal. A statement "SEE NOTE 1." shall be placed adjacent to the symbol, as appropriate.

5.4.5.6 Ammunition maintenance work package <ammowp>. This work package shall reference or contain all procedures required for care and handling of ammunition <handling>, including hazard distances, storage, special requirements, prevention of deterioration due to rough handling, exposure to adverse weather conditions or other hazards. Visual inspection criteria shall be prepared to determine item serviceability. Procedures shall be prepared for disposition of defective ammunition <defect>. These procedures shall include use of cleaning materials and paint authorized for use in the specified maintenance operations <service>. Reference shall be made to the RPSTL for replacement parts and any special tools required and to the Expendable and Durable Items List Appendix for the list of expendable and durable materials. (Refer to figure 11).

5.4.5.7 Auxiliary equipment maintenance work package <auxeqwp>. When auxiliary equipment (e.g., Modified Tables of Organization and Equipment (MTOE) items, etc.) maintenance TMs or maintenance requirements cards are not procured for peculiar equipment furnished by the contractor, maintenance instructions shall be prepared. Instructions shall be prepared for required fabrication of special tools, when such fabrication is approved by the contracting activity, and included in the proper supporting information work package. Concise step-by-step procedures shall be prepared for proper care of auxiliary equipment while in and out of service. These procedures shall include instructions for store, preventive maintenance, lubrication, operating checks, and adjustments, as applicable. (Refer to figure 12).

5.4.5.8 Maintenance work packages <maintwp>. Maintenance information shall be functionally divided into individual maintenance work packages <maintwp>. (Refer to figure 13.) The technical content structure for these work packages shall be consistent from work package to work package. Illustrations shall be prepared to identify the location or the process of the task being performed and shall be integrated with the procedures.

- a. Each maintenance work package shall include all authorized maintenance tasks <maintsk>. Tasks shall consist of complete start-to-finish maintenance procedures <proc> in a logical sequence of occurrence. Task titles <title> shall be identical to FGC titles as used in the applicable MAC and RPSTL. Maintenance tasks are described in 5.4.5.8.1.
- b. Maintenance instructions shall reference or contain all procedures required for any unusual or critical steps such as specifying Quality Assurance (QA) checks (**depot and aviation only**), care and handling of ESD sensitive items and all hazardous material, e.g., ammunition, radioactive components or materials, including prevention of deterioration due to rough handling, exposure to adverse weather conditions, or other hazards. Visual inspection and safety criteria shall be prepared to determine item serviceability. Instructions shall also contain procedures for disposition of defective ammunition. Procedures shall be prepared for use of cleaning materials and paint authorized for use in the specified maintenance operations. Tools shall be described only when the tool or procedure is peculiar or abnormal.
- c. When peculiar to the equipment, applicable Corrosion Prevention and Control (CPC) procedures shall be included, or the work package shall reference applicable CPC publications.
- d. National Stock Numbers (NSNs) shall not be used in procedural steps, illustrations, or legends of maintenance work packages. Part numbers shall not be used in procedural steps, illustrations, or legends, except when essential for identification.
- e. Aviation maintenance TMs shall reference procedures in TM 1-1500-204-23, as applicable.
- f. The maintenance instructions shall be prepared to include required environmental control data and information. Instructions shall be prepared for information on any special maintenance required under extreme temperature, altitude, and humidity conditions within the limits established by the design specification for the equipment.
- g. For **depot only**, a Reliability, Availability, and Maintainability (RAM) table shall be prepared listing the pertinent measurable RAM ranges for the major overhauled components. The RAM requirements shall be prescribed by maintenance engineering of the contracting activity and when established by maintenance engineering shall include critical measurement factors, such as Meantime Between Failures (MTBF), Meantime Between Corrective Maintenance (MTBCM), Maximum Time to Repair (MTR), availability, and maintenance ratio. The reliability and availability portion of the table shall give the minimum acceptable values while the maintainability portion shall provide the maximum allowable rates. Availability may be expressed as a probability versus a qualified number. When specified by maintenance engineering of the contracting activity, the RAM information may also be prepared in a narrative format. (Refer to figure 14.)

5.4.5.8.1 Maintenance tasks <maintsk>. Maintenance tasks shall be prepared for each authorized maintenance level in the general order listed below. For each maintenance task illustrations shall be used to support or clarify the text, including schematics, wiring diagrams, parts location drawings and other visual aids.

Preshop analysis (**depot only**) <pshopanal>.
 Assembly and preparation for use (**aviation only**) <assem>.
 Servicing <service>.
 Ground handling.
 Operational check <opchk>.
 Inspection of installed items <inspinstitm>.
 Removal <remove>.
 Disassembly <dissam>.
 Cleaning <clean>.
 Inspection-acceptance and rejection criteria <acptrejinsp>.
 Nondestructive Testing Inspection (NDTI) <ndti>.
 Repair or replacement <repair-rplc>.
 Alignment <align>.
 Painting <paint>.
 Lubrication <lube>.
 Assembly <assem>.
 Test and inspection <test-inspect>.
 Installation <install>.
 Adjustment <adjust>.
 Calibration <calibration>.
 Radio interference suppression <ris>.
 Placing in service <pis>.
 Testing <test-pass>.
 Quality assurance requirements (**depot only**) (reference only).
 Preservation, packaging, and marking (**depot only**) <ppm>.
 Overhaul and retirement schedule (**aircraft only**) <orsch>.
 Preparation for storage or shipment <pss>.
 Ammunition markings <markings>.
 Classification of ammunition defects <defect>.
 Handling ammunition <handling>.
 Procedures for ammunition activation <arm>.

5.4.5.8.1.1 Maintenance task requirements. Additional mandatory or unique technical information or additional explanations may be required to be included in the maintenance tasks listed in 5.4.5.8.1, above. This information is described in 5.4.5.8.1.2 through 5.4.5.8.1.19. The following general requirements apply to most of the maintenance tasks in 5.4.5.8.1, above.

- a. Peculiar instructions shall be prepared for lockwiring, installing cotter pins, use of sealing compounds, lubricants, or corrosion prevention compounds and similar operations with applicable references to the expendable and durable items list.
- b. Procedures shall not be prepared for separation of bonded, press-fitted, soldered, welded, or riveted parts, or the removal of electronic circuitry parts, unless such removal is necessary to clean, inspect, or test separately.
- c. If servicing (i.e., pressurizing and charging with gas, lubrication, etc.) is required upon completion of a maintenance task, include this information as part of the task.
- d. Warnings and cautions shall be prepared whenever chemicals or cleaning compounds are used or combined which may result in a dangerous or hazardous mixture. Whether the danger is to

personnel or equipment, it shall be identified and the effect (e.g., gases, fumes, caustic, and fire) shall be stated.

- e. For aircraft, instructions shall be prepared for cleaning and washing the entire aircraft. Instructions shall be prepared for the removal of the battery, relief tube, power plant, and armament exhaust deposits, or other items or material as necessary. Instructions shall also be prepared regarding components which require relubrication after the aircraft has been washed or steam cleaned.
- f. Torque requirements, values, and sequences shall be indicated. Only critical torques **<torque>** shall be indicated in task steps. All noncritical torques will be covered by the Torque Limits work package and a reference thereto. Torque values shall be given for all structural attaching hardware, fluid couplings (fuel, oil, hydraulic, pneumatic, etc.), and connections. Torque values shall include torque correction factors when crowfoot extensions, thread lubricants, and cadmium-plated screws or nuts are used. Torque values identified in the tasks must reflect torque wrenches authorized to personnel targeted to perform tasks. Upon completion of torque action, instructions shall be prepared on use of an orientation mark (striping).
- g. Such terms as "reverse the disassembly procedures" or "installation is the reverse of removal" shall not be used in any maintenance task.
- h. Maintenance procedures or steps that have a major quality assurance effect shall be prefixed with the boldface letters **"QA"** to identify them.

5.4.5.8.1.2 Preshop analysis (depot only) <pshopanal>. Preshop analysis shall apply when data indicates that an inspection or test is more effective in determining useful life of a system, subsystem, or component than a mandatory disassembly. The following requirements shall apply.

- a. Scope. The purpose and coverage of the preshop analysis shall be stated.
- b. Unpacking and special handling. Procedures shall be prepared for removing the item, assemblies, subassemblies, or components from the shipping containers and packaging material. Instructions shall be prepared on any needed handling requirements for hazardous material, electrostatic sensitive devices, precious metal content, classified material, or critical material. Instructions shall also be prepared for any special condemnation procedures for the item and its assemblies and subassemblies.
- c. Checking attached documents. Instructions shall be prepared for checking all tags, forms, and documents attached to the item to determine the reason for its return and to identify any other obvious faults or damage.
- d. External inspection. Procedures shall be prepared for external inspection of the item to determine if it is complete and if there is any obvious external damage.
- e. Cleaning and preservation. Instructions shall be prepared for cleaning the item to prepare it for preshop analysis testing. They shall include the procedures for any temporary preservation or corrosion protection measures needed to protect the item until the work required is started.
- f. Preshop analysis procedures. Detailed procedures shall be prepared for performing a preshop analysis.

- (1) Preshop analysis text shall be presented in procedural format. Test and analysis procedures shall be presented in a logical sequence—not to cause any unnecessary disassembly—and in the order in which they should be done. Each procedure shall be identified by a step number. Procedures shall be arranged in groups by major components, assemblies, and subassemblies. Each group shall be headed by an applicable title.
- (2) When specified by the contracting activity, procedures shall be presented as a checklist **<chklst>**, or as a supporting information work package. (Refer to MIL-STD-40051-7). This work package shall be referenced in the preshop analysis task. If the checklist is included as part of the task, the following shall be included.
 - (a) Cover sheet **<coverpage>**. The cover sheet shall contain spaces to record the following item information: part number **<partno>**; serial number **<serialno>**; NSN **<nsn>**, modifications required **<modreq>**; reason for overhaul or repair **<reason>**; unpacking of secondary items required **<secitem>**; review of tags **<revtag>** or forms **<revform>** with the item, name **<name>** and signature **<sig>** of person doing the analysis; and date **<date>**. (Refer to figure 15.)
 - (b) Table of tests and inspections. This table shall have an entry for each test and inspection procedure. Each entry shall have, as a minimum, the following information: inspection point, condition, action, remarks, and identification of the personnel performing the inspection. (Refer to figure 16 (**standard table**).)

5.4.5.8.1.3 Assembly and preparation for use (**aviation only**) **<assem>**.

- a. Procedures shall be prepared for unpacking, assembly, and installation. When the equipment is shipped or delivered in specially designed containers, unpacking instructions shall be prepared. If the containers are to be used again, kept for future use, turned in to supply, or require a special disposition method, the necessary procedures shall be prepared. Assembly and installation procedures shall be prepared when needed. These instructions shall be supported by illustrations. As applicable, power requirements, connections, and initial control settings needed for installation purposes shall be prepared.
- b. For security measures for electronic data, instructions shall be prepared for handling, loading, purging, overwriting, or unloading classified electronic data under usual conditions. Instructions shall meet current security regulations as they pertain to automation security.

5.4.5.8.1.4 Servicing **<service>**.

- a. Instructions shall be prepared for replenishment of fuel; oil; hydraulic or other fluids; oxygen, nitrogen, other gases; and tire pressure, plus any other such items and materials (except for lubricants) required for complete servicing of the equipment.
- b. Servicing instructions shall be supplemented with a diagram showing locations of regular and emergency servicing points. Items located on each side of the equipment which require servicing will be illustrated and identified as right and left side. NO STEP areas on walkways leading to any tank (in an aircraft) shall be indicated and necessary cautions included.
- c. Reference shall be made to the servicing diagram and to the list of expendable and durable items for identification of any fuel, oil, or other materials used. All expendable items used in the

servicing instructions shall be identified by military and federal standard nomenclature and designation number.

- d. The warnings and cautions to observe in servicing a particular tank or reservoir (e.g., grounding and prevention of fire hazards) shall be stated clearly.
- e. Instructions shall be prepared regarding access to any out-of-the-way or unusual places requiring service.
- f. Reference shall be made to graphs or data in other parts of the text pertinent to servicing, such as tire pressure as opposed to gross takeoff weight for aircraft and capacities of tanks.

5.4.5.8.1.5 Ground handling. Descriptions, instructions, and necessary cautions and warnings for ground handling of the aircraft/equipment, including any information needed in extreme cold, heat, humidity, dust, or other unusual or extreme conditions shall be prepared. Instructions for folding and unfolding appropriate parts such as rotor blades or wings, rudders, and fans shall also be included. For aircraft, instructions shall be prepared that are required for blocking and supporting the aircraft during performance of the operation or procedure involved. The following ground handling procedures shall be provided in the order listed below.

- a. Towing <tow>.
- b. Jacking <jack>.
- c. Parking <park>.
- d. Mooring <moor>.
- e. Covering <cover>.
- f. Hoisting <hoist>.
- g. Sling loading <sling>.
- h. External power <extpwr>.

5.4.5.8.1.6 Operational check <opchk>. Operational checks required to ensure the satisfactory performance of the weapon system/equipment, subsystem or components shall be prepared. Starting, runup, and shutdown procedures contained in operator instruction work packages may be referenced. Corrective actions shall be included as a means of referencing the troubleshooting procedures.

5.4.5.8.1.7 Inspection acceptance and rejection criteria <acptrejinsp>. For **depot level and aviation only**, inspection procedures that have a quality impact shall be identified with the boldface letters "QA" preceding them. Instructions shall be prepared for tagging all rejected parts, other than mandatory replacement parts, and listing the reasons for rejection. Visual inspection procedures shall be prepared to detect defects such as burrs, cracks, bends, or dents. Accurate and measurable accept or reject requirements and standards shall be prepared which allow the user to determine if the item under inspection conforms to the tolerances, wear limits, fit, or other standards and requirements presented. Overhaul Inspection Procedure (OIP) tables (**standard table**) shall be prepared for items with critical characteristics or tolerances. Illustrations shall be integrated within the text of the OIP table. (Refer to figure 17.)

5.4.5.8.1.8 Nondestructive Testing Inspection (NDTI) <ndti>.

- a. **(Aircraft only)** When specified by the contracting activity, TM 55-1500-335-23 shall be the only NDTI document referenced in the NDTI procedures, and technical provisions of this TM shall be followed.
- b. **(Aircraft only)** Individual NDTI procedures shall be specified for each part requiring NDTI. In order to satisfy this requirement, the following shall be prepared for aircraft TMs.
 - (1) If penetrant is required, identification of the particular TM 55-1500-335-23 process that is applicable.
 - (2) If magnetic particle inspection is required, the specific TM 55-1500-335-23 method, the type of magnetization, and amount of current or ampere turns.
- c. The reject criteria shall be specified in all cases. This shall be done by means of a blanket statement, individual criteria for a part, or a combination of both.
- d. Unless specified otherwise by the proponent activity, instructions for use of visible dye penetrants shall not be included as part of NDTI instructions. When required, refer to TM 55-1500-335-23 for preparation of those instructions.
- e. When several NDTI methods are permitted, the relative order of preference shall be specified.
- f. Instructions shall be prepared for removing primer and/or paint for TMs that require the removal process as part of NDTI procedures. If a part requires a special process, this procedure must be contained within the NDTI procedure for that part.
- g. Cleaning requirements prior to, during, and after NDTI shall be specified. If a part has a built-in bearing, then a procedure shall be prepared to ensure protection of the bearing for the NDTI procedure.

5.4.5.8.1.9 Repair or replacement <repair-rplc>. Instructions shall be prepared for repair or replacement to restore an item to a completely serviceable or fully mission capable status. Depot level maintenance shall include data plate replacement data. For data plates which require replacement, the type of material shall be indicated. Detailed preparation and attachment instructions shall be prepared. The instructions for stamping data plates shall include the initials of the facility performing the overhaul or modification, the contact number (if applicable), the date of overhaul or modification, the part number, and the total operating time since new (if applicable). The instructions shall specify the letter and figure sizes and indicate their placement (adjustment to manufacturer's data). The following statement shall be inserted.

"When sufficient space is not available on the existing data plate to add information, the plate shall be replaced and all pertinent data transferred to the new plate. Data shall not be stamped directly on any part, assembly, or item of equipment except when approved by the Government."

5.4.5.8.1.10 Test and inspection <test-inspect>. Procedures shall be prepared for testing and inspection during or after assembly to ensure proper assembly of the item. Correct methods of testing; procedures for making tolerance checks; and procedures for inspection of distance measurements (e.g., clearance, end play, backlash) shall be prepared. Measurement criteria and tolerances shall reflect the Test Measurement and Diagnostic Equipment (TMDE) available to the user. **(Depot and aviation only)** Test and inspection

procedures which have a major quality assurance effect shall be prefixed by the boldface letters "QA" to identify them.

5.4.5.8.1.10.1 Inspection and test of conventional and chemical ammunition or components containing radioactive materials (-30, -40, and AVIM only). The following information shall be prepared.

- a. A statement to the effect that inspection criteria are provided to assure that maintenance performed will restore the items to an acceptable quality level shall be included. Regulations and technical publications relating to policy responsibility and procedures applicable to ammunition stockpile reliability, ammunition surveillance, radioactive materials procedures, and quality evaluation programs shall be referenced. The types of inspection procedures shall, at a minimum, include a premaintenance inspection to be conducted during unpacking, in-process inspections, and final acceptance inspection.
- b. Instructions shall be prepared for inspection methods or techniques used to detect defective components or end items being processed. Classification of Material Defects tables (**standard table**) shall be prepared for ammunition components and packaging and packing material. The tabulated data shall include a list of components, categories of defects (minor, major, critical) attributable to each component, a list of defects by category, a reference to the work package or the TM containing corrective action, the inspection methods used to determine if corrective action was accomplished, and the acceptable quality level established for each defect. (Refer to figure 18.)
- c. Visual inspection criteria shall be prepared for the packing of the items in conformance with the inspection criteria noted in subparagraph a. above.
- d. Detailed procedures and criteria shall be prepared for function testing. When test fixtures must be fabricated, diagrams and instructions for the fabrication shall be prepared. Where ammunition is required for function testing weapons, it shall be identified in a table by Department of Defense Ammunition Code (DODAC), NSN, and nomenclature, to include dummy rounds.
- e. Instructions shall be prepared to establish a uniform system of examination for deterioration or damage. Definitions shall be prepared to explain minor, major, and critical defects. Lower maintenance levels shall be included, when appropriate.
- f. A classification of defects (i.e., minor, major, or critical) for both functioning and nonfunctioning categories shall be included. The criteria shall conform to the publications noted in subparagraph b. above.
- g. Instructions for disposition of lots shall be prepared and shall be as specified by the contracting activity.

5.4.5.8.1.10.2 Pre-embarkation inspection of material in units alerted for overseas movement. Pre-embarkation inspection procedures shall be prepared, if applicable, and shall be as specified by the procuring activity.

5.4.5.8.1.11 Placing in service <pis>. Instructions shall be prepared for actions not previously noted that may be required for an assembly, component, or end item. Instructions shall be prepared such as removal of

an item from storage and preparation for installation on an end item. Final servicing checks, calibration, leak checks, charging, pressurizing, and operational checks shall be prepared.

5.4.5.8.1.12 Testing <test-pass>. Instructions shall be prepared, as applicable, to test the performance of components, assemblies, and subassemblies prior to installation in the end item. The following instructions are required for depot and aviation maintenance.

- a. **(Depot and aviation only)** Instructions shall be prepared for recording the results of the testing. All testing procedures that have a major quality assurance effect shall be prefixed by the boldface letters "QA" to identify them.
- b. **(Depot only)** Information shall be prepared for final testing of the highest assembly or equipment/end item involved to assure that the parameters of reliability, availability, maintainability, and durability are met. The following procedures shall be prepared.
 - (1) Inspection. Inspection procedures shall be prepared that are required prior to final testing to assure that the item is complete and ready for final testing. Instructions shall be prepared for any minor preparation tasks needed prior to final testing.
 - (2) Lubrication. Any final lubrication procedures that need to be done prior to final testing shall be prepared.
 - (3) Final test procedures. Test procedures, performance standards, and tolerances shall be prepared to establish that the equipment is adequately overhauled and ready for issue without qualifications. The procedures shall list all tools, TMDE, jigs, fixtures, and other support items required for the test. Operating instructions shall be prepared for special test equipment where necessary. Procedures shall be prepared for minor adjustments that can be done without disassembling equipment. Complete procedures shall be prepared for burn-in or run-in tests.
 - (4) Final painting, refinishing, and marking. Procedures shall be prepared for any final painting, refinishing, and marking that could not be done during the overhaul procedures. The materials and tools required to do the job shall be identified.

5.4.5.8.1.13 Quality assurance requirements (depot only). Quality assurance requirements shall be prepared as a supporting information work package. (Refer to MIL-STD-40051-7.) A reference to the work package shall be included here.

5.4.5.8.1.14 Preservation, packaging, and marking (depot only) <ppm>. The following instructions shall be prepared.

- a. Packaging information. The following statement shall be included verbatim.

 "Refer to the packaging segment of the Army Master Data File Retrieval Microform System (AMDF) file for detailed packaging information. If AMDF does not contain the information that you need, you must contact the AMC Packaging, Storage, and Containerization Center, Tobyhanna Army Depot, for packaging information."
- b. Special instructions. Instructions shall be prepared for any special or unique preservation, packaging, or marking instructions that apply to the equipment. These instructions shall

include warnings, cautions, or references concerning ESD, nuclear material, hazardous substances, special marking instructions, or any other instructions required that are not covered in the standard packaging and preservation information.

5.4.5.8.1.15 Overhaul and retirement schedule (aircraft only) <orsch>. This maintenance task shall include the following statement and associated list.

"OVERHAUL AND RETIREMENT SCHEDULE

Units of operating equipment that are to be overhauled or retired at the period specified are listed here. Unless otherwise specified in TM 1-1500-328-23, Aeronautical Equipment Maintenance Management Policies and Procedures, removal of equipment for overhaul may be accomplished at the inspection nearest the time when overhaul is due."

5.4.5.8.1.16 Preparation for storage or shipment <pss>. As applicable, the following instructions shall be prepared.

- a. Security procedures and special transportation requirements for sensitive items (security, terrorists, etc.).
- b. Special preservation, packaging, packing, marking, ESD protective and control measures, and shipping instructions, including use of special design reusable containers.
- c. Instructions on special use of corrosion-preventive compounds, moisture barriers, and desiccant materials.
- d. Directions or reference to instructions for applying special identifying, shipping, and cautionary markings to shipping containers; including security classification, special temperature requirements, and shelf life.
- e. Instructions will be provided by the procuring activity for placing equipment in, and for removing it from, administrative storage.
- f. Procedures for proper handling, blocking, and bracing of basic load ammunition when being transported in trucks and other tactical vehicles.
- g. Basic load storage, quantity-distance, class, and storage compatibility groupings, storage temperatures, stacking limits, and other pertinent storage requirements (for conventional and chemical ammunition only).
- h. For aviation ground support equipment, a reference to TM 1-1500-204-23 for general technical information for preparation for storage or shipment.

5.4.5.8.1.17 Classification of defects <defect>. Procedures shall be prepared for performing visual inspection of ammunition/containers (pallets, boxes, etc.) and shall include classification and disposition of defective ammunition/containers.

5.4.5.8.1.18 Handling ammunition <handling>. Procedures shall be prepared for handling ammunition.

- a. Unpacking <unpacking>. As a minimum, the following information shall be prepared.

- (1) Any special sequence of action necessary to protect the ammunition.
- (2) If a special design reusable container is involved for either the end item or components which are authorized for replacement, instructions shall be prepared to report or reenter the empty container through supply channels.
- (3) Man-hour requirements and total man-hours required for unpacking the ammunition.

b. Packing <packing>. As a minimum, the following information shall be prepared.

- (1) Any special sequence of action necessary to protect the ammunition.
- (2) Instructions shall be prepared on how to package defective ammunition.
- (3) Man-hour requirements and total man-hours required for packing the ammunition.

5.4.5.8.1.19 Procedures needed to activate ammunition, mine, etc. <arm>. Procedures shall be prepared for activation of ammunition, mines, etc.

5.4.5.9 Phased maintenance inspection work package (aircraft phased maintenance checklist only) <pmi-cklistwp>. This work package shall include the following information, in a phased maintenance checklist. (Refer to figure 19.)

a. The work package shall begin with the following note:

"NOTE

Prior to start of the Phased Maintenance Inspection, it is recommended that a pre-inspection maintenance test flight (MTF) be conducted. Accomplishment of the MTF shall be determined by the unit maintenance officer. The pre-inspection MTF should be conducted by a maintenance test pilot following a review of the aircraft forms and records and a briefing from the crew of the aircraft. The MTF is recommended to assess the aircraft performance and identify deficiencies that should be corrected while the aircraft is undergoing phased maintenance inspections."

- b. General inspection <geninspec> items specified by the procuring activity.
- c. Aircraft area inspection <areainspec> items approved by the procuring activity. List shall be a logical sequence requiring a minimum of time and motion on the part of the individual performing the inspection.
- d. Aircraft Power On Checks <pwron-inspec> as approved by the procuring activity.
- e. Aircraft final inspection <finalinspec> requirements as specified by the procuring activity.

5.4.5.10 Preventive maintenance services inspection work package (aircraft only) <pms-inspecwp>. All aircraft items requiring inspection and the inspection procedures shall be included in this work package. The checklist data <pms-form> shall be included in a table as provided in figure 20 and numbered in sequence (e.g., area 1 and item 3 will appear at 1.3).

- a. The elements to be inspected daily shall be listed under area and sequence number. (See figure 20). Followed by any additional element required for intermediate inspection (when applicable) and then by the additional elements required for periodic inspection. Since the periodic inspection requirements include all intermediate inspection requirements and the intermediate inspection requirements include all daily inspections requirements, an X in the D column will result in an X in the I and P columns. The additional intermediate requirements will likewise be identified by an X in the I column and also result in an X in the P column. When the inspection items are not to be performed during each inspection (I, P), the interval/frequency shall be stated in the applicable column (i.e., 2nd, 3rd, etc.).
- b. Power On and Power Off inspection requirements shall be separated so that power will only have to be applied to the aircraft one time during the entire inspection. The Power On items shall be grouped together under the heading "Power On" and shall follow after completion of the last Power Off requirement for the entire aircraft. Power On items shall fall in the proper numerical area and the first item number shall be the next higher number following the last item number of the Power Off requirement.
- c. The title or heading of each inspection area, relating to the area diagram (paragraph 5.4.5.10.3) shall begin 1-1/2 inches below last item or procedure of the preceding inspection area.
- d. All communications and navigation electrical equipment inspections (black boxes, etc., which are the inspection and repair responsibility of avionics personnel) shall be included in a separate grouping following Power On inspection requirements and shall not appear in the normal inspection sequence.

NOTE

For avionics equipment inspection the following statement shall be included.

"Perform avionics inspections, check and test electrical equipment as required in TM 11-(*insert TM number*). DA Form 2404, Equipment Inspection and Worksheet, shall also be used to record results of inspections by avionics personnel."

5.4.5.10.1 Mandatory safety-of-flight inspection items. Mandatory safety-of-flight inspection items shall be emphasized by using bold type print.

5.4.5.10.2 Work time. Work times for each item in the checklist shall be included in the work time W/T column. The total time for each I and P inspection shall be indicated at top of checklist (figure 20).

5.4.5.10.3 Area diagram. Area diagram of the aircraft, showing sequences for inspection by area shall be included. The area identified shall include all surfaces, material, components and equipment pertaining to that specific location (figure 21). The legend shall identify the title or heading of each numbered area of the diagram.

5.4.5.10.4 Standard checklist statements. The following statements shall be included in the applicable inspection section and in proper sequence.

- a. The first item of each inspection for each aircraft shall read: "Inspect aircraft forms and records for recorded discrepancies (DA PAM 738-750, Functional User's Manual for the Army Maintenance Management System (TAMMS))."

- b. One of the last items in each preventive maintenance services manual shall be the lubrication requirements and shall be entered as follows.

LUBRICATION

All area. Lubricate in accordance with lubrication chart contained in TM 55-(insert TM number)-20 or -23.

- c. Include the following statements, as applicable:

- (1) Windshields and windows for cleanliness.
- (2) Tire for proper pressure (visual), no cuts, blisters or slippage.
- (3) Pitot tubes and static ports for freedom of obstructions and cleanliness.
- (4) Portable fire extinguisher for broken or missing seal, pressure indicator in green, and extinguisher and brackets secure. Fixed fire extinguisher for accessibility, broken, or missing seal, and extinguisher and bracket for security.
- (5) First aid kits for designated location, presence of inspection date tag, condition of seal, and security.
- (6) All visible and all accessible electrical wiring for chafing, or damaged insulation and for security of connections.
- (7) Battery for leakage and security (nicad and lead acid). Battery compartment interior for cleanliness and corrosion. Battery and connections for security, cleanliness and corrosion. Battery vent for obstructions, proper positioning.
- (8) Instrument gage markings for accuracy and legibility; all gage lens for cracks, cleanliness, looseness, and slippage.
- (9) Static discharge wicks for overall length of 6 inches maximum and 1 inch minimum exposed wick beyond plastic sheath.
- (10) Static discharge ground for condition and security.

- d. Include the following statements as applicable in the intermediate inspection requirements. If the intermediate inspection is not required, the inspections listed below shall be included as periodic inspection requirements as determined by the procuring activity.

- (1) 2nd - Compass correction card for availability and legibility.
- (2) 2nd - Safety belts and shoulder harness for damage, corrosion, cuts, fraying and security.
- (3) 2nd - Inertial reels for damage, security, and positive locking and unlocking.
- (4) 2nd - Seats for damage, security, and positive movement and locking in all positions.

- (5) Every intermediate inspection - First aid kits for completeness of side pocket contents, and legible identification markings.
 - (6) 2nd Battery - (nicad and lead acid) for leakage. Battery compartment interior for cleanliness and corrosion. Battery and connections for security, cleanliness and corrosion. Battery vent for obstructions, proper positioning.
- e. Include the following statements as applicable in the periodic inspection requirements.
- (1) Spark plugs (fine wire), remove and inspect.
 - (2) Instrument range markings for accuracy and legibility; all gage lens for cracks, cleanliness, looseness, and slippage.
 - (3) Static discharge wicks for overall length of 6 inches maximum and 1 inch minimum exposed wick beyond plastic sheath.
 - (4) Static discharge ground for condition and security.
 - (5) Spark plugs (massive electrode), remove and inspect.
 - (6) 2nd - Starter brushes for wear (specify) and freedom of movement in brush holder. Brush leads for deterioration or evidence of chafing. Commutator for evidence of arcing and presence of oil or metal particles. Electrical connections for security.
 - (7) Magneto breaker compartment for cleanliness. Breaker points for pitting, ventilator plugs or screens for cleanliness, and cam wiper for lubrication.
 - (8) Pitot and static system for absence of foreign material and moisture.
 - (9) Fixed fire extinguishers for accessibility, broken or missing seal, and extinguisher and bracket for security. Weight check cylinder, less valve.
- f. Include the following statement as the last item of the checklist.

“Forms and Records Completion: Ensure that all entries on forms, records and work sheets have been completed or updated and new forms initiated as required (DA PAM 738-750, Functional User’s Manual for the Army Maintenance Management System (TAMMS)).”

6. NOTES.

The notes in section 6 of MIL-STD-40051 apply to this Part.

TM 9-2350-314-24

CHAPTER 6
UNIT MAINTENANCE INSTRUCTIONS
FOR
155MM, M109A6 HOWITZER

FIGURE 1. Example of a maintenance instruction chapter title page.

TM 11-6625-3178-14	
FREQUENCY CONVERTER ASSEMBLY REPLACEMENT	1744 00
THIS WORK PACKAGE COVERS: Removal, Installation	
INITIAL SETUP:	
Maintenance Level Unit	Personnel Required Maintainers, Two (one to assist)
Tools and Special Tools Tool Kit, General Mechanics (Item 37, WP 3201 00)	General Safety Instructions
Materials/Parts Frequency Converter, A31U29270-1	<div style="text-align: center; border-top: 1px solid black; border-bottom: 1px solid black; margin: 10px 0;"> WARNING </div> Remove all power from the Frequency Converter circuit. Frequency converter requires a two person lift.
<div style="text-align: right; margin-top: 10px;">1744 00-1</div>	

FIGURE 2. Example of scope of task and initial setup information .

TM 9-1090-208-23-1-1

SERVICE 30MM AUTOMATIC GUN UPON RECEIPT**0067 00****THIS WORK PACKAGE COVERS:**

Unpacking, Cleaning, Inspection

INITIAL SETUP**Tools and Special Tools**

Tool Set, NSN 5180-00-987-9816

Personnel Required

Aircraft Armament/Missile Systems

Repairer 68J (3) (Two to assist)

Aircraft Armament Technical Inspector 68J3T

Materials/Parts

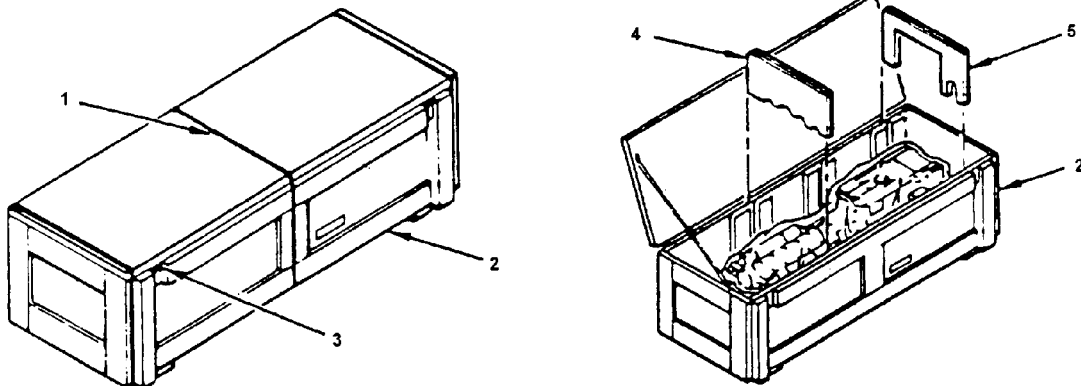
Grease (Item 6, WP 0596 00)

WARNING

The gun shipping/storage container weighs approximately 163 pounds, when loaded. Three people are required to lift or move the container.

UNPACKING

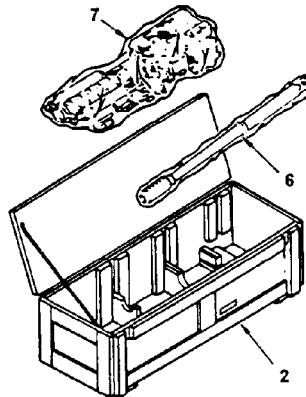
1. Cut and remove three straps (1) around grith of storage container (2).
2. Open two link-lock fasteners (3) and lift lid.
3. Remove two cradles (4) and (5). Grasp top of cradle (4) or (5) and lift straight up.

**0067 00-1**FIGURE 3. Example of a service upon receipt work package.

TM 9-1090-208-23-1-1

SERVICE 30MM AUTOMATIC GUN UPON RECEIPT - Continued**0067 00****UNPACKING - Continued**

4. Remove automatic gun barrel assembly (6) from shipment and storage container (2).
 - a. Remove gun barrel (6) from envelope package.
 - b. Remove pressure tape and barrier material from gun barrel (6).

**WARNING**

The gun firing mechanism weighs approximately 76 pounds. Two people are required to remove it from the shipping/storage container.

5. Remove gun firing mechanism (7) from shipping and storage container (2).
 - a. Remove gun mechanism (7) from envelope package.
 - b. Remove pressure tape and cushioning material from gun mechanism (7).

CLEANING

1. Clean automatic gun firing mechanism (WP 0089 00).
2. Clean automatic gun barrel assembly (WP 0093 00).

INSPECTION

1. Visually check gun firing mechanism for missing or damaged parts.

END OF TASK**0067 00-2**

FIGURE 3. Example of a service upon receipt work package - Continued.

TM 9-1410-644-10

SERVICE UPON RECEIPT - Continued

0114 00

Table 2. Inspection Criteria for Packaging.

COMPONENT	ACCEPTABLE	REPARABLE	NONREPARABLE
Wooden Boxes and Crates			
Hardware	Operative and tight. Nails, screws, and fasteners present and in good condition.	Inoperative or loose. Nails, screws, and fasteners that can be replaced or properly sealed.	None None
=====			
Ends	Free from damage.	Broken or missing cleats and handles.	Damage that requires disassembly of box.
Wood	Splits less than 3 inches long, no closer than 1 inch to edge of board or adjoining split. The board must be secured by at least one nail on each side of the split when it extends to the end of the board.	Splits more than 3 inches but no closer than 1 inch to edge of board or adjoining split, or 1/2-inch wide, that can be repaired by use of corrugated fasteners.	Splits closer than 1 inch to edge of board or adjoining split or over 1/2-inch wide.
Fiber Containers			
Metal Ends	Minor rust, cracks, indentations, or splits that would not impair water proofing or serviceability of container.	None	Perforations, excessive rust, or ends which are crushed or not securely crimped to body.
Body and Cap	No tears, cuts or gouges.	Cuts, tears, or gouges not closer than 1 inch to closure, less than 1/2 square inch in area, and unpenetrated layers that can be spot painted.	Cuts, tears, or gouges closer than 1 inch to closure, more than 1/2 square inch in area, or through all impregnated layers.

0114 00-2

FIGURE 4. Example of packaging inspection/service upon receipt.

TM 9-1410-644-10

SERVICE UPON RECEIPT - Continued

0114 00

Table 3. M29 and M30 Control Surfaces and Containers.

LOCATION	ITEM	ACTION	REMARKS
1. Container	Components	1. Inspect for rust, fungus, paint damage, and deformation. 2. Reject container if damage prevents it from functioning properly.	WP 0125 00 --
2. M29	Control Surfaces	1. Inspect for dents and scratches on post, trailing edge phenolic, skin, and closure plate. 2. Reject control surface: a. If post dents or scratches exceed 0.002 in. (0.051 mm). b. If trailing edge phenolic dents exceed 0.040 in. (10.160 mm). c. If skin dents exceed 0.030 in. (7.620 mm) within 2 in. (50.800 mm) of post. d. If closure plate dents exceed 0.030 in. (7.620 mm) within 2 in. (50.800 mm) of post.	WP 0128 00 --
3. M30	Control Surfaces	1. Inspect for dents and scratches on post and skin. 2. Skin dents or scratches up to 0.050 in. (12.700 mm) are allowable, but should be blended. 3. Reject control surface if post dents or scratches exceed 0.002 in. (0.051 mm).	-- -- --

0114 00-3

FIGURE 4. Example of packaging inspection/service upon receipt - Continued.

TM 1-4220-250-12&P	
DONNING AND FITTING THE SRU-37/P	1324 00
THIS WORK PACKAGE COVERS: Donning, Fitting	
INITIAL SETUP: Maintenance Level Aviation Unit	
GENERAL The container assembly is designed to be worn on the user's chest, upper back, or lower back. If the SARVIP is to be worn, it shall be donned first. The SRU-37/P shall then be donned over the SARVIP.	
CHEST MOUNTING OPTION.	
<div style="border-top: 3px double black; border-bottom: 3px double black; margin: 0 auto; width: 100px;"> WARNING </div>	
FLIGHT CONTROL RESTRICTION When the SRU-37/P is worn on the chest, certain size individuals in certain helicopters may experience aft cyclic control restriction.	
<ol style="list-style-type: none"> 1. Position the SRU-37/P across the chest and place both shoulder straps over the shoulders and back. The right shoulder strap with male buckle shall be passed under the left armpit and securely inserted into the female buckle of the left cross strap. The left shoulder strap with male buckle shall be passed under the right armpit and securely inserted into the female buckle of the right cross strap. Ensure that both buckle assemblies are securely fastened. This is essential for the prevention of inadvertent release while performing aircrew duties or during emergencies. 2. Adjust the straps, taking up the slack until snug against the body. Be sure to allow for unobstructed access to the beaded inflation handle. 	
HIGH BACK MOUNTING OPTION.	
<div style="border-top: 3px double black; border-bottom: 3px double black; margin: 0 auto; width: 100px;"> WARNING </div>	
When the SRU-37/P is worn in the high back position, the straps must be loosened to allow the aviator/crewmembers to reach the beaded activation handle.	
<ol style="list-style-type: none"> 1. Place the SRU-37/P across the top of the back (between shoulder blades). Place the shoulder straps over the chest and attach buckles in the same manner as step 1, above - right to left and left to right. Ensure that the buckle assemblies are securely fastened. 2. Adjust the straps, taking up the slack until snug against the body. 	
END OF TASK	
1324 00-1	

FIGURE 5. Example of an equipment/user fitting instruction work package.

TM 3-6665-339-10	
NBCRS FOX M93A1 PREVENTIVE MAINTENANCE CHECKS AND SERVICES	0062 00
<p>THIS WORK PACKAGE COVERS:</p> <p>Introduction, PMCS Procedures</p>	
<p>INITIAL SETUP:</p> <p>Maintenance Level Operator</p>	
<p>INTRODUCTION</p> <p>General</p> <p>Preventive Maintenance Checks and Services (PMCS) are performed to keep the vehicle in operating condition. The checks are used to find, correct, or report problems. Crewmembers are to do the PMCS jobs as shown in the PMCS table. PMCS are done every day the vehicle is operated, using the PMCS table. Pay attention to WARNING and CAUTION statements. A WARNING means someone could be hurt. A CAUTION means equipment could be damaged.</p> <p>Before you begin operating vehicle equipment, do Before PMCS.</p> <p>During operation, do During PMCS.</p> <p>After operation, do After PMCS.</p> <p>Once a week do Weekly PMCS. If vehicle has not been operated in a week, also do Before PMCS at the same time.</p> <p>Do Monthly PMCS once a month. If vehicle has not been operated in a month, also do After PMCS at the same time.</p> <p>If you are operating the vehicle for the first time, do your Weekly and Monthly PMCS the first time you do your Before PMCS.</p> <p>If you find something wrong when performing PMCS, fix it if you can, using troubleshooting procedures and/or maintenance procedures.</p> <p>The right-hand column of the PMCS table lists conditions that make the vehicle not fully mission capable. Write up items not fixed on DA Form 2404 for unit maintenance. For further information on how to use this form, see DA PAM 738-750.</p> <p>If tools required to perform PMCS are not listed in WP 1479 00, notify unit maintenance.</p> <p>Leakage Definition</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>Equipment operation is allowable with minor leakages (Class I or II) except for fuel leaks. Of course, consideration must be given to the fluid capacity of the item or system being checked. When in doubt, ask your supervisor.</p> <p>When operating with Class I or II leaks, continue to check fluid levels as required in your PMCS.</p> <p>Class III leaks should be reported immediately to your supervisor.</p> <p style="text-align: right; padding-right: 50px;">0062 00-1</p>	

FIGURE 6. Example of a PMCS introduction.

TM 3-6665-339-10

NBCRS FOX M93A1 PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Continued

0062 00

INTRODUCTION - Continued

It is necessary to know how fluid leakage affects the status of the vehicle. The following are definitions of the classes of leakage an operator or crewmember needs to know to be able to determine the condition of the leak. Learn and then be familiar with them, and REMEMBER - WHEN IN DOUBT, ASK YOUR SUPERVISOR.

Leakage Definitions for Crew/Operator PMCS.

CLASS I - Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.

CLASS II - Leakage of fluid great enough to form drops but not enough to cause drops to drip from item being checked.

CLASS III - Leakage of fluid great enough to form drops that fall from the item being checked.

INSPECTION

Look for signs of a problem or trouble. Senses help here. You can feel, smell, hear, or see many problems. Be alert when on the vehicle.

Inspect to see if items are in good condition. Are they correctly assembled, stowed, secured, excessively worn, leaking, corroded, or properly lubricated? Correct any problems found or notify unit maintenance.

There are some common items to check all over the vehicle. These include the following:

1. Bolts, clamps, nuts, and screws: Continuously check for looseness. Look for chipped paint, bare metal, rust, or corrosion around bolt and screw heads and nuts. Tighten them when you find them loose. If tools are not available, notify unit maintenance.
2. Welds: Many items on the vehicle are welded. To check these welds, look for chipped paint, rust, corrosion, or gaps. When these conditions exist, notify unit maintenance on DA Form 2404
3. Electrical wires, connectors, and harnesses: Tighten loose connectors. Look for cracked or broken insulation, bare wires, and broken connectors. If any are found, notify unit maintenance.
4. Hoses and fluid lines: Look for wear, damage and leaks, and make sure clamps and fittings are tight. Wet spots mean a leak. A stain by a fitting or connector can also mean a leak. When you find a leak, notify unit maintenance.

LUBRICATION SERVICE INTERVALS - NORMAL CONDITIONS

For safer, more trouble free operations, make sure that your vehicle is serviced when it needs it. For the proper lubrication and service intervals, see LO 9-6665-376-12.

LUBRICATION SERVICE INTERVALS - UNUSUAL CONDITIONS

Your vehicle will require extra service and care when you operate under unusual conditions. High or low temperatures, long periods of hard use, or continued use in sand, water, mud, or snow will break down the lubricant, requiring you to add or change lubricant more often.

CLEANING AND LUBRICATION

Proper cleaning and lubrication can aid in avoiding possible problems or trouble, so make it a habit to do the following:

CAUTION

Follow all cleaning and lubricating instructions carefully. Failure to do so can result in damage to equipment.

1. Expose canvas covers and tarpaulins to fresh air during semiannual service. Reduce interval as required in a rainy climate. Do not stow canvas items when wet.

0062 00-2

FIGURE 6. Example of a PMCS introduction - Continued.

TM 3-6665-330-10					
NBCRS FOX M93A1 PREVENTIVE MAINTENANCE CHECKS AND SERVICES					0132 00
THIS WORK PACKAGE COVERS: PMCS Checks and Services					
INITIAL SETUP: Maintenance Level Operator					
Table 1. Preventive Maintenance Checks and Services for NBCRS FOX M93A1.					
ITEM NO.	INTERVAL	MAN-HOUR	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
1	Before		Vehicle Exterior	<p style="text-align: center;">NOTE</p> <p>Driver, commander and crew will inspect for damaged or missing items while performing checks in walkaround sequence.</p> <p>COMMANDER</p> <p>Check for damaged and missing items. Check lighting fixtures. Make sure all stowed items (pioneer equipment, etc.) are secured to vehicle for travel.</p> <p>Secure stowed items. Replace missing items. Report major damage of lighting fixtures. Report minor damage after operations.</p>	Any damage or missing items that will prevent operation
2	Before		Left Side Exterior	<p>DRIVER</p> <p style="text-align: center;">NOTE</p> <p>If leakage is detected, further investigation is needed to determine the location and cause of the leak.</p> <p>1. Check underneath vehicle for evidence of fluid leakage.</p>	Any class III leak of oil, fuel, or coolant.
3	Before		Left Side Tires	<p>DRIVER</p> <p style="text-align: center;"><u>WARNING</u></p> <p>Operating a vehicle with an improperly inflated tire or with a questionable defect may lead to premature tire failure and cause equipment damage, injury, or death to personnel.</p> <p>Check for missing or damaged tires and wheels. Visually check for proper tire inflation.</p>	Missing or damaged tires or wheels. Flat or deflated tires.

0132 00-1

FIGURE 7. Example of a PMCS table format.

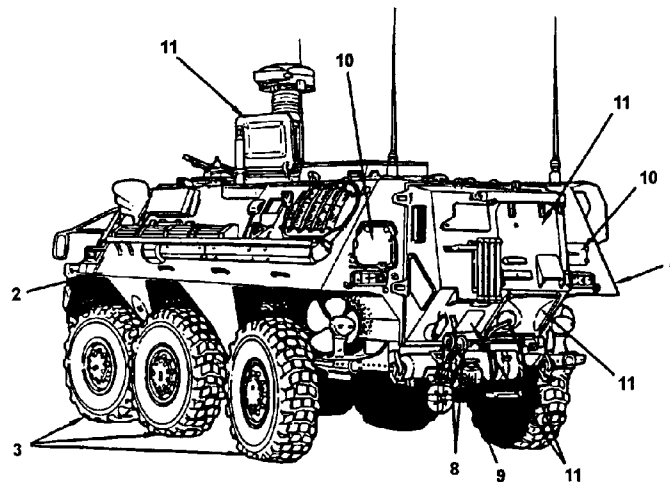
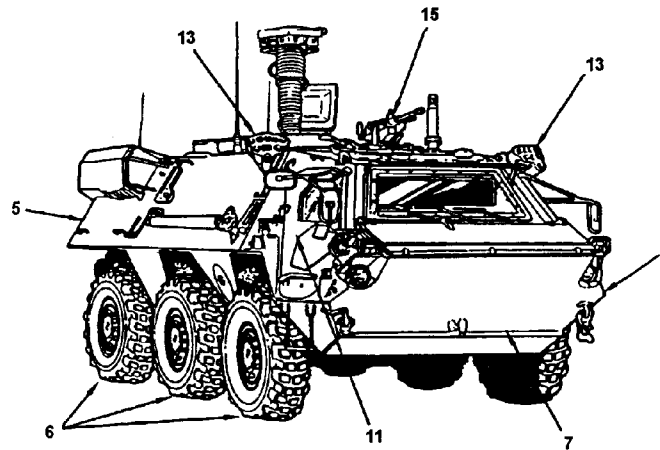
TM 3-6665-330-10

**NBCRS FOX M93A1 PREVENTIVE MAINTENANCE
CHECKS AND SERVICES - Continued**

0132 00

Before "Vehicle Exterior Walkaround" PMCS Procedures

These illustrations will help you perform BEFORE vehicle exterior walkaround PMCS. The callouts match PMCS item number/procedures.



0132 00-2

FIGURE 7. Example of a PMCS table format - Continued.

TM-9-1015-256-23					
M198 HOWITZER PREVENTIVE MAINTENANCE CHECKS AND SERVICES, INCLUDING LUBRICATION INSTRUCTIONS - Continued					0632 00
Table 1. Preventive Maintenance Checks and Services for (XXX) - Continued					
ITEM NO.	INTERVAL	MAN-HOUR	ITEM TO BE CHECKED OR SERVICED	CREWMEMBER PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
7	Before		Recuperator	<p><u>CREWMEMBER 1</u></p> <p><u>WARNING</u></p> <p>Do not remove cap (37) when engine is hot</p> <p>1. Check pins (35) before firing. Pins must not extend over 3/4 inch (19.1mm); 1/8 inch (3.2mm) is correct. If pins (35) do extend beyond 3/4 inch, remove cap (37) from valve (36) and add hydraulic fluid (item 5, WP 0746 00) until pins extend 1/8 inch.</p> <p>NOTE</p> <p>The recuperator is charged with a pressure of 550 psi (38.5 kg/cm²) in the M109 and M109A1. With temperature of 100° F or over, 600 psi (42.0 kg/cm²) in the M109A1 is recommended.</p> <p>RECUPERATOR: INSIDE END</p>	Pins (35) extend over 3/4 inch

FIGURE 8. Example of a PMCS table format with crew member grouping.

SEMI-ANNUAL (1500 MILE) PMCS MANDATORY REPLACEMENT PARTS LIST (A0/A1)

ITEM NO.	PART NUMBER	NSN	NOMENCLATURE	QTY
1	D5-19-2353	4240-01-026-3112	PRECLEANER AND PART (A1 ONLY)	01
2	MS24665-285	5315-01-061-2060	PIN, COTTER	01
3	MS35333-42	5310-00-595-7237	WASHER, LOCK	03
4	MS35338-43	5310-00-045-3296	WASHER, LOCK	01
5	MS35338-44	5310-00-582-5965	WASHER, LOCK	16
6	MS35338-46	5310-00-004-5033	WASHER, LOCK	09
7	MS51922-1	5310-00-088-1251	NUT, SELF-LOCKING	04
8	MS51922-17	5310-00-087-4652	NUT, SELF LOCKING	17
9	11628247	5330-01-109-1925	GASKET	02
10	12294872	5310-01-107-3356	WASHER, FLAT	02
11	2585163-57	5306-00-163-2850	BOLT, SELF-LOCKING	01

ANNUAL (3000 MILE) PMCS MANDATORY REPLACEMENT PARTS LIST (A0/A1)

ITEM NO.	PART NUMBER	NSN	NOMENCLATURE	QTY
1	D5-19-2353	4240-01-026-3112	PRECLEANER AND PART (A1 ONLY)	01
2	MS24665-283	5315-00-842-3044	PIN, COTTER	02
3	MS24665-285	5315-01-061-2060	PIN, COTTER	01
4	MS35333-42	5310-00-595-7237	WASHER, LOCK	03
5	MS35338-43	5310-00-045-3296	WASHER, LOCK	01
6	MS35338-44	5310-00-582-5965	WASHER, LOCK	16
7	MS35338-46	5310-00-004-5033	WASHER, LOCK	09
8	MS51922-1	5310-00-088-1251	NUT, SELF-LOCKING	08
9	MS51922-13	5310-00-984-3807	NUT, SELF-LOCKING	02
10	MS51922-17	5310-00-087-4652	NUT, SELF LOCKING	17
11	MS51922-21	5310-00-959-1488	NUT, SELF-LOCKING	01
12	MS51922-5	5310-09-959-7600	NUT, SELF, LOCKING	01
13	11628247	5310-01-109-1925	GASKET	02
14	11664669	2910-00-152-2033	FILTER ELEMENT, FLUID	01
15	12294872	5310-01-107-3356	WASHER, FLAT	02
16	254608S	5330-01-050-2624	GASKET	02
17	255815S	5330-01-328-9920	GASKET	02
18	2585163-57	5306-00-163-2850	BOLT, SELF-LOCKING	01
19	3302180S	5330-01-328-9921	GASKET	02

FIGURE 9. Example of a PMCS mandatory replacement parts list.

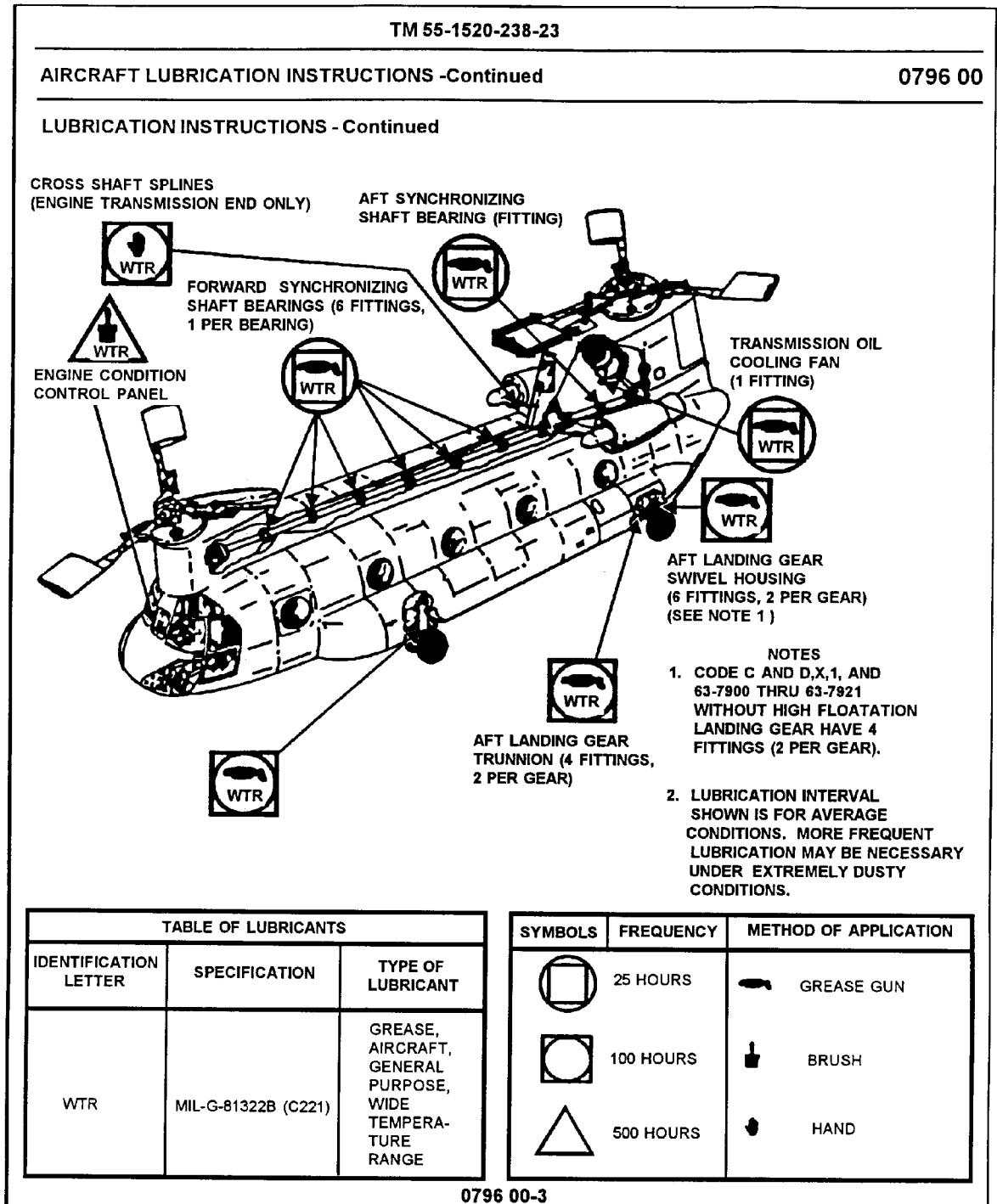


FIGURE 10. Example of a lubrication chart.

TM 9-2350-314-10	
155 MM, M284 HOWITZER CANNON AMMUNITION MAINTENANCE	1567 00
THIS WORK PACKAGE COVERS: Care, Handling, Storage, Inspection, and Cleaning	
INITIAL SETUP:	
Maintenance Level Operator	Materials/Parts Cloth, wiping (item 31, WP 0479 00)
CARE	
<ol style="list-style-type: none"> 1. Ammunition is packaged to withstand conditions ordinarily encountered in the field. Keep packing boxes from becoming broken or damaged. 2. Since ammunition is impaired by moisture, frost, extreme temperature, and foreign matter (mud, oil, etc.), observe the following: <ol style="list-style-type: none"> a. Do not break the moisture-resistant seal on the container until ammunition is to be used. b. Shield all ammunition from high temperatures (e.g., the direct rays of the sun). When covering projectiles to provide this shield, cover with tarpaulin keeping 18 in. (45.7 cm) air space over and 6 in. (15.2 cm) of air space on sides. This will ensure free air flow necessary to keep the projectiles cooler in hot weather. c. Refer to WP 1992 00 for information regarding maintenance of the M712 Copperhead (HEAT) projectile. d. Store M110 projectile in an upright position at all times. 	
HANDLING	
<div style="border: 1px solid black; width: 100px; margin: 0 auto; padding: 5px;">WARNING</div> <p style="margin-top: 10px;">Keep fire and flammable materials out of the ammunition areas. There will be no smoking in the vicinity of ammunition.</p> <p style="margin-top: 10px;">Shield all ammunition from high temperatures (e.g., direct rays of the sun). When outside temperature is expected to reach +100°F (+38°C), failure to shade could result in damage to material and loss of life.</p> <ol style="list-style-type: none"> 1. Do not expose ammunition and components containing explosives to extreme temperatures. Do not expose to direct sunlight, flame, or other sources of heat. 2. Do not expose unpacked propelling charges and fuzes to rain, excessive humidity, or ground moisture. 	
1567 00-1	

FIGURE 11. Example of an ammunition maintenance work package.

TM 9-2350-314-10

155 MM, M284 HOWITZER CANNON AMMUNITION MAINTENANCE - Continued**1567 00****HANDLING - Continued**

3. Prevent rough handling of projectiles and fuzes. Do not strike projectiles together and do not off-load ammunition by dropping projectiles on top of projectiles.
4. Protect fuzes, primers, and flash reducers at all times from foreign matter and impact. A drop of 4 feet (1.20 m) may cause the electrolyte vital in a VT fuze battery to break, thus causing a dud.
5. Do not disassemble fuzes.

STORAGE**WARNING**

Ammunition exposed directly to sunlight, or in unventilated containers, enclosures, shelters, freight cars, closed vehicles, and similar structures exposed to direct sunlight may reach temperatures exceeding upper storage limits. Avoid exposure of ammunition components to direct sunlight. Do not store ammunition assembled with tetrytol-loaded bursters (i.e., projectiles, 155mm; smoke, WP, M110; gas H, and HD, persistent, M110) at temperatures exceeding +125°F (+52°C)

Temperature Limits

1. Except as otherwise specified, observe the following limits:
 - a. Lower limit is -80°F (-62°C) for a period of not more than 3 days.
 - b. Upper limit is +160°F (+71°C) for a period of not more than 4 hours per day.
2. Store or transport M110 projectiles containing WP at a temperature below the melting point (+111.4°F (+44°C)) of the WP filler. If this is not practicable, store or transport such projectiles on their bases so that, should the WP filler melt, it will resolidify with the void in the nose of the projectile. This restriction does not apply to the M825/M825A1 WP projectile.
3. Protect proximity fuzes and proximity rounds from long exposure to high humidity. Store M728 and M732 fuzes in temperatures between -65°F to +145°F (-54°C to +63°C) and 0°F to +120°F (-18°C to +49°C) for the M514 series.

1567 00-2FIGURE 11. Example of an ammunition maintenance work package - Continued.

TM 9-1005-319-23&P

BLANK FIRING ATTACHMENT (M15A2) MAINTENANCE

0062 00

THIS WORK PACKAGE COVERS:

Removal, cleaning, inspection, painting, replacement, and installation

INITIAL SETUP:**Maintenance Level**

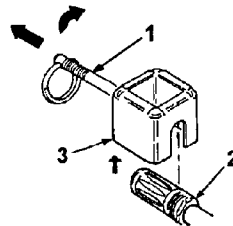
Unit

Materials/PartsCleaner, lubricant, and preservative (CLP)
(Item 9, WP 1132 00)Coating compound, enamel (Red-
M16A2) (Item 23, WP 1132 00)**General Safety Instructions**Do not keep live ammunition near the
work area.Only blank cartridge M200 is to be used
when the blank firing attachment is
attached to the weapon.**GENERAL**This work package contains information and instructions to keep auxiliary equipment used with your
weapon in good repair.**REMOVAL****CAUTION**

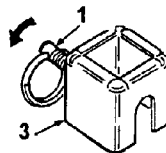
Do not use tools to tighten the blank firing attachment.

USE HANDS ONLY.

1. Unscrew slide (1) to remove from compensator (2).
2. Unhook blank firing attachment (3) from behind the first groove of compensator (2).



3. Screw slide (1) all the way in on blank firing attachment (3).



0062 00-1

FIGURE 12. Example of an auxiliary equipment maintenance work package.

TM 9-1005-319-23&P

BLANK FIRING ATTACHMENT (M15A2) MAINTENANCE - Continued

0062 00

CLEANING

1. Clean blank firing attachment with CLP, wipe dry, and coat with CLP.

INSPECTION

1. Inspect blank firing attachment for cracks or distortion. Be sure the parts in the slide are clear and clean. If blank firing attachment is cracked or distorted, it is unserviceable.

PAINTING

1. Repaint blank firing attachment using enamel coating compound (Red for M16A2 rifle or Yellow for M4/M4A1 carbine). Painting is the only repair authorized.

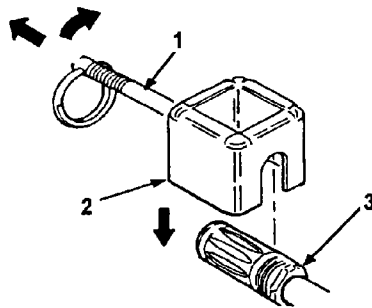
REPLACEMENT

1. Replace blank firing attachment if unserviceable.

INSTALLATION**NOTE**

M23 blank firing attachment is stamped "M4 Carbine Only" painted yellow and may be used on the M4 and M4A1 carbines. M15A2 BFA is painted red and is used on the M16A2 rifle.

1. Unscrew and pull slide (1) all the way out on blank firing attachment (2).
2. Hook blank firing attachment (2) behind the first groove of the compensator (3).

**END OF TASK**

0062 00-2

FIGURE 12. Example of an auxiliary equipment maintenance work package - Continued.

TM 11-6625-3178-14

CHEMICAL ALARM MOUNT ASSEMBLY REPLACEMENT**0267 00****THIS WORK PACKAGE COVERS:**

Removal, Installation

INITIAL SETUP**Maintenance Level**

Unit

Materials/Parts

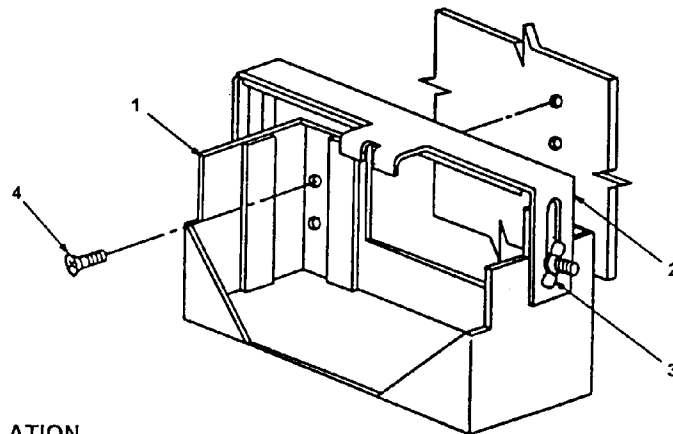
Bracket Assembly, Chemical Alarm, A3070119

Tools and Special Tools

Tools Kit, Electrical NSN 5180-01-195-0855

REMOVAL

1. On chemical alarm mount assembly (1) loosen two wing nuts (3) holding clamp assembly (2) and rotate clamp assembly forward.
2. Remove chemical alarm and set aside.
3. Remove four screws (4) and remove chemical alarm mount assembly from shelter wall.

**INSTALLATION**

1. Position new chemical alarm mount assembly (1) on shelter wall and secure with four screws (4).
2. Replace chemical alarm set aside in removal step 2.
3. Rotate clamp assembly (2) back to upright position and secure by tightening two wing nuts (3).

END OF TASK**0267 00-1**FIGURE 13. Example of a maintenance work package.

Requirements for XXX System

System	MTBF	MTR	A_o
Track	500 mi	30 min	0.89
Engine	170 hr	43 min	0.92
Hull	1,000 mi	80 min	0.86
Radio	400 hr	10 min	0.95
Night Sight	145 hr	10 min	0.88
Gun Tube	10,000 rds	45 min	0.95

Maintenance Ratio for XXX System 0.35

<u>Unit</u>	<u>DS</u>	<u>GS</u>	<u>Depot</u>
0.10	0.05	0.08	0.07

EXAMPLE OF TABULAR RAM DATA**Requirements for XXX System****Maintainability**

When maintenance procedures shown in the technical manuals are followed, the mature maintainability data are as follows:

1. Mean Operator Preventive Maintenance Time shall not exceed 0.25 man-hours per mission. This time shall not be included in organizational preventive maintenance time.
2. Maximum operator Corrective Maintenance Time shall not exceed 1.00 man-hours per mission without being classified as a mission failure.
3. The ratio of total corrective and organizational preventive maintenance man-hours to operating hours shall not exceed 0.10.
4. The ratio of total organizational preventive maintenance man-hours to total operating hours shall not exceed 0.04.
5. The ratio of total corrective maintenance man-hours to operating hours shall not exceed 0.06.
6. Mean man-hours to perform a corrective maintenance action shall not exceed 2.5.
7. The Mean Time Between Corrective Maintenance Actions shall not be less than 150 operating hours.
8. The engine shall have an 80 percent probability of not requiring replacement in 20,000 miles of operation.
9. The gun tube shall have an 80 percent probability of not requiring replacement in 50,000 rounds of operation.
10. The track shall have a 92 percent probability of not requiring replacement in 5,450 miles of operation.

EXAMPLE OF NARRATIVE RAM DATAFIGURE 14. Example of tabular and narrative reliability, availability, and maintainability data .

PRESHOP ANALYSIS FOR P/N _ _ _ _ _

Serial No. _ _ _ _ _
NSN _ _ _ _ _

MWOs Required _ _ _ _ _

Reason(s) for Overhaul/Repair _____

Unpacking Secondary Items Required ? _ _ _ _
Reviewed Tags ? _ _ _ _
Reviewed Forms ? _ _ _ _

Name (please print) _ _ _ _ _
Signature _ _ _ _ _ Date _ _ _ _ _

FIGURE 15. Example of a cover sheet for preshop analysis checklist.

Table 6. Preshop Analysis Checklist.

INSPECTION POINT	CONDITION	ACTION	REMARKS	DONE BY
<u>GENERAL</u>				
Gear Box	Reason(s) for removal from service.	Record:		
	Modification only.	WP 0725 00		
	Burned.	WP 0725 00		
	Crash damage, accident damage, hard landing, sudden stoppage.	WP 0725 00		
	Metal on magnetic plug, contamination, internal failure.	WP 0725 00		
	Dropped.	WP 0725 00		
	No records or historical data.	WP 0725 00		
<u>EXTERIOR INSPECTION</u>				
Case Assembly	Cracks, corrosion, nicks, dents, scratches, pits, broken studs.	Visual, OIP-16		
Output Sleeve	Cracks, corrosion, nicks, dents, burrs, scratches.	Visual, OIP-22		
Output Shaft	Cracks, nicks, dents, or pits on spline; wear over pin dimension of spline not within allowable limits; corrosion.	Visual, OIP-29		
Input Sleeve	Cracks.	Visual, OIP-1		

FIGURE 16. Example of a preshop analysis checklist, table of tests and inspections.

Table 2. Overhaul Inspection Procedures for Gear (Item 15, fig. 21).

QA REQ	NO.	REF LTR	CHARACTERISTIC	INSP METHOD	REQUISITE
	1		Serviceability	Visual	No cracks, chipped grooves, or missing gear teeth
Yes	2		Metal fatigue	Magnetic Particle Inspection	No cracks
Yes	3	A	Tooth wear	Measure with micrometer (599-30-11) over two 0.1920 in. (4.877mm) gage pins	2.256 in. (57.30 mm) min.

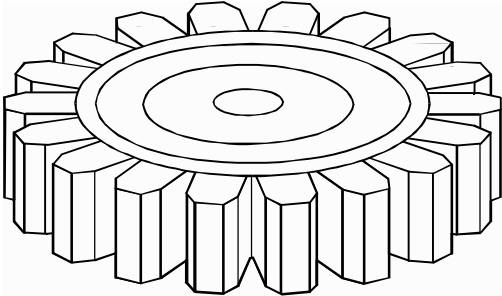

FIGURE 17. Example of an OIP table .

Table 2. Classification of Materiel Defects.

CATEGORIES OF DEFECTS/COMPONENTS AND DEFECTS	WP NO. OR TM WITH CORRECTIVE ACTION	INSPECTION METHODS AFTER CORRECTIVE ACTION	ACCEPTABLE QUALITY LEVEL
<u>CRITICAL:</u>			
1. Fuze not set on SAFE.	WP 0120 00	Visual	Fuze set on SAFE.
2. Fuze well liner missing.	WP 0120 00	Visual	Fuze well liner in place.
<u>MINOR:</u>			
1. Fuze stake missing.	WP 0120 00	Visual	Fuze stake replaced.
2. Supplementary charge spacer missing.	WP 0120 00	Visual	Supplementary charge spacer replaced.
3. Supplementary charge damaged.	WP 0120 00	Visual	Supplementary charge replaced.
4. Explosive on fuze well threads.	WP 0120 00	Visual	Fuze well threads without caked explosive.
5. Shear or twist pin above flush.	WP 0120 00	Visual	Shear or twist pin flush.

FIGURE 18. Example of a classification of material defects table.

PHASE NO. _____		PHASED MAINTENANCE CHECKLIST			
Area Name and No. GENERAL		Aircraft Serial No.		Date:	Total Hrs. This Area
Inspection Phase Nos	Inspection Requirements	Status	Faults and/or Remarks	Action Taken	Initial
ALL	1. Prior to inspection, check forms and records for recorded deficiencies (Table 1-2).				
ALL	2. Fuel tanks shall be fully serviced prior to start of phased inspection. If maintenance is to be accomplished which requires refueling, this item may be deferred until after such maintenance is completed.				
ALL	3. Perform avionics inspections systems inspection checks and tests as applicable in avionics maintenance manual.				
ALL	4. Perform armament systems inspection checks and tests as applicable in armament maintenance manuals.				

“FOD REMINDER”

Check work area for tools and parts after completion of maintenance and inspections.

FIGURE 19. Example of a phased maintenance checklist.

INSPECTION TOTAL WORK TIME						D	I	P			
Seq. No.	Item and Procedure	D	I	P	W/T	Seq. No.	Item and Procedure	D	I	P	W/T
1.1	NOSE AREA Aircraft forms and records for recorded discrepancies (TM 38-750).	X	X	X		2.6	First aid kits for designated location, presence of inspection date tag, broken or missing seal, legible identification markings, and security	X	X	X	
1.2	Nose section exterior for damage.	X	X	X		2.7	Seats and mission equipment securely installed or stowed. Copper safety wire on armored seat quick release for condition and security.	X	X	X	
1.3	Nose compartment interior for ss, equipment for damage and loose connections, and door for secure latching.	X	X	X		2.7.1	Seats and mission equipment for damage, positive movement, and locking. Safety belts and shoulder harnesses for damage, corrosion, cuts, fraying, and security. Inertia reels for positive locking and unlocking.		2nd	X	
1.4	Pitot tube and static ports for obstructions and cleanliness.	X	X	X		2.7.2	Inspect armored seats for positive recline movement.			X	
1.4.1	Disconnect pitot/static lines from instrument ports. Remove drain caps from moisture traps.			X		2.8	All instruments for cleanliness, damage, and presence of slippage marks on gage lens.	X	X	X	
1.4.2	Purge pitot/static system with clean dry air pressure (10 - 60 PSI). Reconnect lines and caps and inspect system for leaks utilizing instrument test set.			X		2.8.1	All instrument range markings for accuracy and legibility. All gage lens for looseness and slippage.			X	
1.5	Windshields and windows for cleanliness, scratches, and cracks.	X	X	X		2.9	Deleted				
1.6	Test FAT gage (TM 55-1500-204-25/1).			X							

FIGURE 19. Example of a phased maintenance checklist.

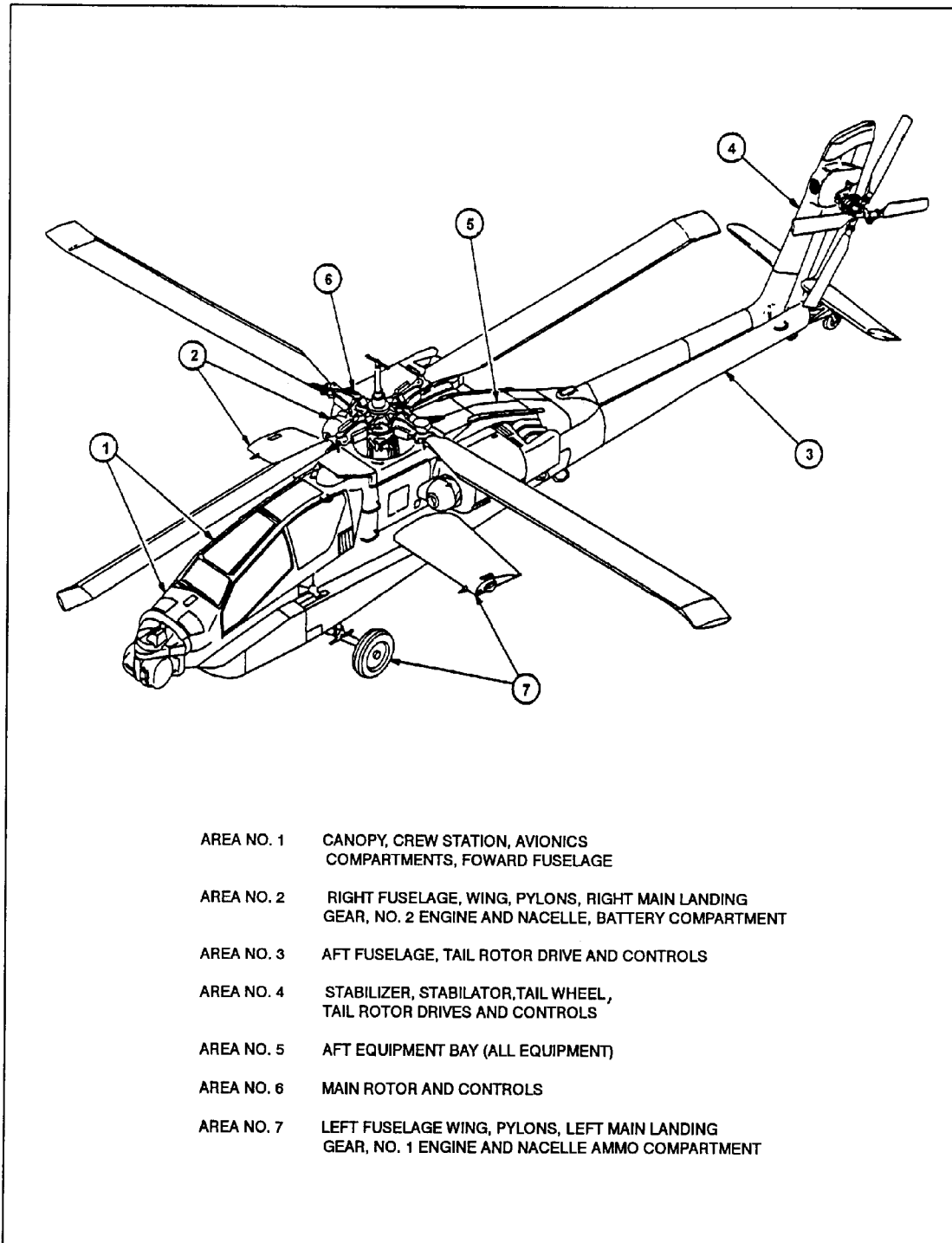


FIGURE 21. Example of an area diagram.

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